8820 Broadband Access Concentrator

Installation Guide

Document No. 8820-A2-GN20-80

November 2004

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⚠ Important Safety Instructions

1. Read and follow all warning notices and instructions marked on the product or included in the manual.
2. All installation and service must be performed by qualified service personnel, as opening or removing covers may expose you to dangerous high voltage points or other risks.
3. Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these slots and openings must not be blocked or covered.
4. Special cables, which may be required by the regulatory inspection authority for the installation site, are the responsibility of the customer. To reduce the risk of fire, use a UL Listed or CSA Certified, minimum No. 26 AWG telecommunication cable.
5. When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.
6. A rare phenomenon can create a voltage potential between the earth grounds of two or more buildings. If products installed in separate buildings are **interconnected**, the voltage potential may cause a hazardous condition. Consult a qualified electrical consultant to determine whether or not this phenomenon exists and, if necessary, implement corrective action prior to interconnecting the products.
7. Connect the product to a –42 to –57 VDC SELV (Models 8820-A2-500, 8820-A2-515, and 8820-A2-520) or a –40 to –72 VDC (Model 8820-A2-530) TNV-2 supply source that is electrically isolated from an AC source or provided by batteries. The DC source is to have one pole reliably connected to earth. Connect the earthing (grounding) wire to the protective earthing (grounding) lug connector, identified by the protective earth symbol.
8. Do NOT apply power to both front and rear terminal blocks simultaneously.
9. Use 8 AWG (10 mm2) fixed power source wires with strain relief.
10. This product is to be installed only in a Restricted Access Location (dedicated equipment rooms, equipment closets or the like) in accordance with articles 110-16, 110-17 and 110-18 of the National Electrical Code, ANSI/NFPA 70.
11. In addition, if the equipment is to be used with telecommunications circuits, take the following precautions:
    - — Never install telephone wiring during a lightning storm.
    - — Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
    - — Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
    - — Use caution when installing or modifying telephone lines.
    - — Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
    - — Do not use the telephone to report a gas leak in the vicinity of the leak.
12. **CAUTION**: A mechanical hazard exists due to fans being energized when hot swapping cards. Keep hands and fingers clear from rotating blades.
13. **CAUTION**: An energy hazard exists on the backplane. Do not touch or bridge pins on the connectors.
14. The SCM-OC3 and SCP-OC3 printed wiring board assemblies (Models 8022, 8023, 8024, 8412, 8413, and 8414) contain a Class 1 laser transponder, which provides optical coupling to the telecommunications network. Avoid exposure or eye contact with the aperture, since invisible radiation is emitted from this device.

EMI Notices

⚠ UNITED STATES – EMI NOTICE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The authority to operate this equipment is conditioned by the requirements that no modifications will be made to the equipment unless the changes or modifications are expressly approved by Paradyne Corporation.

⚠ CANADA – EMI NOTICE:

This Class A digital apparatus meets all requirements of the Canadian interference-causing equipment regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du réglement sur le matérial brouilleur du Canada.

Notice to Users of the Canadian Telephone Network

The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION:

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

CE Marking

When the product is marked with the CE mark on the equipment label, a supporting Declaration of Conformity may be downloaded from the Paradyne World Wide Web site at **www.paradyne.com**. Select *Library* → *Technical Manuals* → *CE Declarations of Conformity.*

Japan

Class A ITE

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This is a Class A product based on the standard of the Voluntary Control Council for interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

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About This Guide

Document Purpose and Intended Audience

▶ **This document applies to the Model 8820-A2-5xx Broadband Access Concentrator (BAC).**

This document is written for administrators and technicians who install devices at the central office (CO). This document should be used in conjunction with the appropriate line card documentation.

Document Summary

Section	Description
Chapter 1, *Introduction*	Provides general information about what types of cards can be used in the 8820 BAC, and describes features of the BAC.
Chapter 2, *Installation*	Describes what is supplied with the 8820 BAC, how to install it, and how to install cards into the chassis.
Chapter 3, *Cabling: Line Card Tip and Ring*	Describes how to install the cables that provide tip and ring connections for the line cards.
Chapter 4, *Cabling: Standard SIM*	Describes how to install the cables used with the standard 24-port SIM.
Chapter 5, *Cabling: Test Access SIM*	Describes how to install the cables used with the 12-port Test Access SIM.
Chapter 6, *Troubleshooting*	Lists suggested solutions to possible BAC problems and describes the front panel LEDs.
Appendix A, *Pinouts*	Provides pinouts for the BAC connectors as well as for connectors on cards that can be used in the BAC.
Appendix B, *Technical Specifications*	Lists the physical characteristics of the BAC.
Index	Lists key terms, acronyms, concepts, and sections in alphabetical order.

A master glossary of terms and acronyms used in Paradyne documents is available on the World Wide Web at **www.paradyne.com**. Select *Support* → *Technical Manuals* → *Technical Glossary*.

Product-Related Documents

Complete documentation for this product is available online at **www.paradyne.com**. Select *Support* → *Technical Manuals*.

Document Number	Document Title
6050-A2-GZ40	*Hotwire Central Office Universal POTS Splitter, Models 6050 and 7020, Installation Instructions*
8000-A2-GB22	*Hotwire Management Communications (MCC) Card, IP Conservative, User's Guide*
8000-A2-GB26	*Hotwire MVL, ReachDSL, RADSL, IDSL, and SDSL Cards, Models 8310, 8312/8314, 8510/8373/8374, 8323/8324, and 8343/8344, User's Guide*
8000-A2-GZ40	*Hotwire MCC Card, IP Conservative, Installation Instructions*
8021-A2-GB20	*Hotwire Shelf Concentration Module (SCM) Card User's Guide*
8021-A2-GZ40	*Hotwire Shelf Concentration Module (SCM) Card Installation Instructions*
8303-A2-GZ40	*Hotwire 8303/8304 IDSL Cards Installation Instructions*
8312-A2-GZ40	*Hotwire 8312/8314 MVL and ReachDSL/MVL Cards Installation Instructions*
8335-A2-GB20	*Hotwire ATM Line Cards, Models 8335, 8355, 8365, and 8385, User's Guide*
8335-A2-GZ40	*Hotwire ATM Line Cards, Models 8335, 8355, 8365, and 8385, Installation Instructions*
8343-A2-GZ40	*Hotwire 8343/8344 Packet SDSL Cards Installation Instructions*
8373-A2-GZ40	*Hotwire 8373/8374 RADSL Cards Installation Instructions*
8400-A2-GB20	*Shelf Concentration and Processing (SCP) Card with ATM Uplink User's Guide*
8400-A2-GB21	*Shelf Concentration and Processing (SCP) Card with IP Uplink User's Guide*
8400-A2-GZ40	*Shelf Concentration and Processing (SCP) Card Installation Instructions*
8700-A2-GB20	*Hotwire TDM SDSL Termination Units, Models 8777 and 8779, User's Guide*
8700-A2-GN10	*Hotwire TDM SDSL Termination Units, Models 8777 and 8779, Installation Instructions*
8700-A2-GN15	*Hotwire TDM SDSL Termination Units, Models 8775 and 8785, Installation Instructions*

Document Number	Document Title
8774-A2-GB20	*Hotwire 8774 TDM SDSL Termination Unit, with DSX-1 Interface, User's Guide*
8774-A2-GZ40	*Hotwire 8774 TDM SDSL Termination Unit, with DSX-1 Interface, Installation Instructions*
8776-A2-GB20	*Hotwire 8776 TDM SDSL Termination Unit, with G.703 Interface, User's Guide*
8776-A2-GZ40	*Hotwire 8776 TDM SDSL Termination Unit, with G.703 Interface, Installation Instructions*
8784-A2-GB20	*Hotwire 8784 TDM SDSL Termination Unit, with DSX-1 Interface, User's Guide*
8784-A2-GZ40	*Hotwire 8784 TDM SDSL Termination Unit, with DSX-1 Interface, Installation Instructions*
8786-A2-GB20	*Hotwire 8786 TDM SDSL Termination Unit, with G.703 Interface, User's Guide*
8786-A2-GZ40	*Hotwire 8786 TDM SDSL Termination Unit, with G.703 Interface, Installation Instructions*
8799-A2-GB20	*Hotwire 8799 TDM SHDSL Line Card, with G.703 Interface, User's Guide*
8799-A2-GZ40	*Hotwire 8799 TDM SHDSL Line Card, with G.703 Interface, Installation Instructions*
8900-A2-GB20	*ATM Line Cards, Models 8955, 8965, and 8985, User's Guide*
8900-A2-GZ40	*ATM Line Cards, Models 8955, 8965, and 8985, Installation Instructions*
8990-A2-GN10	*T1 and E1 IMA Line Cards, Models 8995 and 8997, Installation and User's Guide*

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Introduction

1

What is the 8820 Broadband Access Concentrator?

The 8820 Broadband Access Concentrator (BAC), which can be installed at the Network Service Provider (NSP) location, provides high-speed Internet or intranet access. The BAC is a 20-slot chassis with integral power distribution and conditioning, as well as alarm, cooling, and interface subsystems designed to house up to 18 Digital Subscriber Line (DSL) port cards. An Asynchronous Transfer Mode (ATM) backplane provides ATM aggregation across multiple DSL port cards.

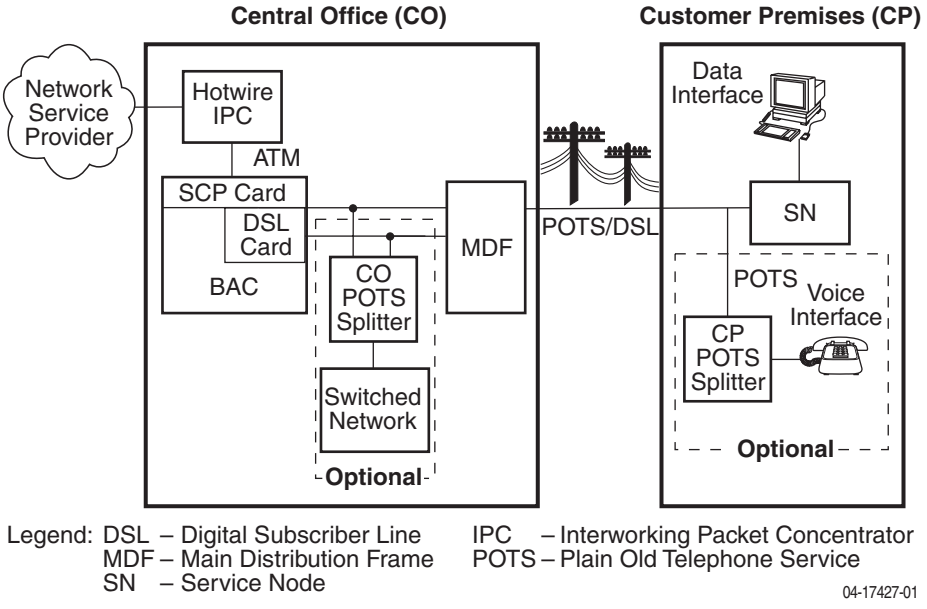
With Release 3.0 of the BAC, there are two configurations:

- **SCP-card-based.** A Shelf Concentration and Processing (SCP) card is installed in Slot A or B to provide the management functions of the MCP and the aggregation functions of the SCM. A second SCP card may be installed for redundancy. The chassis supports up to 864 ports.

  The SCP card supports Models 8955, 8965, 8968, and 8985 ATM line cards, the Model 8995 T1 IMA card, and the Model 8997 E1 IMA card. With an MCP installed, legacy TDM cards (Models 8775, 8777, 8779, and 8799) are also supported.

- **SCM-based.** A Management Control Processor (MCP) card is installed in Slot 9 for management of the line cards. The Shelf Concentration Module (SCM), installed in Slot A, provides aggregation of DSL traffic for the chassis. The chassis supports up to 408 ports.

The following illustration shows a high-level view of a typical configuration for an 8820 BAC.



8820 BAC Cards

The BAC accepts the following types of cards:

- **SCP card**

  Provides aggregation of DSL traffic on the ATM bus for the shelf, and administers and provides diagnostic connectivity to the line cards. The SCP card acts as a mid-level manager and works in conjunction with an SNMP network management system, such as OpenLane®, via its LAN port or inband management channel. It gathers operational status for each of the line cards and responds to the SNMP requests. The card also has a serial port for local terminal access. The SCP is designed as a replacement for both the MCP card and the SCM card.

- **MCP card**

  Administers and provides diagnostic connectivity to the line cards. The MCP acts as a mid-level manager and works in conjunction with an SNMP network management system, such as OpenLane®, via its LAN port or inband management channel. It gathers operational status for each of the line cards and responds to the SNMP requests. The card also has a serial port for local terminal access.

- **SCM card**

  Provides aggregation of DSL traffic on the ATM bus for the shelf.

- **Line cards**

  Provide a processor and an Ethernet or ATM interface to the NSP. The processor controls the modems and forwards the packet traffic to and from the Ethernet, ATM and DSL interfaces. Models include:

  — 8303 24-port Integrated Services Digital Network (ISDN) Digital Subscriber Line (IDSL) card that interoperates with the 6301 and 6302 IDSL Routers.

  — 8304 24-port Packet IDSL 2B1Q card with ATM uplink that interoperates with the 6301 and 6302 IDSL Routers.

  — 8312 12-port ReachDSL cards that interoperate with the Hotwire 6310 and 6350 ReachDSL modems.

  — 8314 12-port ReachDSL card that interoperates with the Hotwire 6310 and 6350 ReachDSL modem.

  — 8335 16-port ATM SDSL card.

  — 8343 24-port Packet Symmetric Digital Subscriber Line (Packet SDSL) CAP (Carrierless Amplitude and Phase Modulation) card that interoperates with the 6341 and 6342 SDSL Routers.

  — 8344 24-port Packet SDSL CAP card with ATM uplink that interoperates with the 6341 and 6342 SDSL Routers.

  — 8355 24-port ReachDSL card that interoperates with the Hotwire 6390 ReachDSL modem.

  — 8365 12-port ATM Asymmetric Digital Subscriber Line (ADSL) card.

  — 8373 12-port Rate Adaptive Digital Subscriber Line (RADSL) card that interoperates with the 5620 Remote Termination Unit (RTU) or the 6371 RADSL Router.

  — 8374 12-port RADSL card with ATM uplink that interoperates with the 6371 RADSL Router.

  — 8385 24-port ATM Symmetric High-bit-rate Digital Subscriber Line (SHDSL) card.

  — 8777 and 8779 8-port TDM SDSL cards that interoperate with the Hotwire 7974, 7975, and 7976 TDM SDSL Standalone Termination Units.

  — 8799 8-port TDM SHDSL card that interoperates with the Hotwire 7995 and 7996 TDM SHDSL Endpoints.

  — 8955 24-port ReachDSL card that interoperates with the Hotwire 6390 ReachDSL modem, for use with the SCP card.

  — 8965 24-port and 8968 48-port ATM ADSL2+ cards, for use with the SCP card.

  — 8985 24-port ATM SHDSL card, for use with the SCP card.

  — 8995 8-port T1 IMA card, for use with the SCP card.

  — 8997 8-port E1 IMA card, for use with the SCP card.

RADSL, ReachDSL, IDSL, SDSL, ATM SDSL, ATM ADSL, TDM SDSL, and TDM SHDSL cards are generically referred to as line cards in this document.

Table 1-1 shows which line cards can be used with the different SCP card, MCP, and SCM configurations.

Table 1-1. Line Card Interoperability

SCP Card	SCP Card and MCP	SCM and MCP
8955 8965 8968 8985 8995 8997	8775 8777 8779 8799 8955 8965 8968 8985 8995 8997	8303 8304 8312 8314 8335 8343 8344 8355 8365 8373 8374 8385 8777 8779 8799

8820 BAC Features

The 8820 BAC has the following special features:

- **Dual Power Access**

  The BAC provides both front and rear power access, each capable of accepting two independent DC power inputs. Front power access is made through two Power Entry Modules (PEMs), located on the front of the chassis. Rear power access is made on the back of the chassis, directly to the backplane-mounted screw terminals located behind two removable metal covers. At the option of the user, the DC power input connections can be made either through the two PEMs on the front, or through the screw terminals on the rear of the chassis, as long as both are not used at once. However, for ease of maintenance, rear connection is recommended.

  Two PEMs are available:

  — Model 8820-S2-903 accepts –48 VDC input

  — Model 8820-S1-906 accepts –48 VDC or –60 VDC input

- **Power Redundancy**

  The two PEMs mounted in the front of the chassis provide power redundancy. If one power source fails, the other PEM provides all of the power needed by the system. This happens automatically without system disruption.

  NOTE:

  When using either front or rear power access, two separate power sources must be provided to enable the power redundancy function of the chassis. Also, the PEMs must be installed even though rear power is used.

- **Major/Minor Alarm Contacts for CO Alarm Requirements**

  The BAC provides two sets of dry contacts via the System Interface Module (SIM), accessible through an 8-pin modular jack, for connection to a CO alarm system.

- **LED Indicators for Power and Fan Status and Major and Minor Alarms**

  Five LEDs on the front panel of the BAC indicate the status of important functions (see *LEDs* in Chapter 6, *Troubleshooting*).

- **Hot-Swappable Cards**

  The MCP, backup SCP card, and line cards can be installed and removed from the chassis without service disruption to other cards. However, installing or removing an active SCP or SCM card will affect service to all cards using the uplink.

- **ATM Uplink**

  The ATM uplink provides various network services, applications, and protocols (including DS3, OC3, E3, DS1 IMA, and E1 IMA) over a common ATM transport and switching system.

- **Network Equipment-Building System (NEBS)**

  The BAC is NEBS certified.

Installation

2

Preinstallation Considerations

Consider the following before installing the 8820 BAC:

- **Installation Site**

  Your installation site should be well ventilated, clean, and free of environmental extremes. There should be 2 to 3 feet (61 to 91.5 cm) of clearance at the front of the rack in which the chassis is to be installed to allow access for the installation of the chassis, circuit cards, and cables. Also allow a minimum of 4 inches (10 cm) at the rear of the rack for proper venting and cabling space (see *Cabling* on page 2-2). If the BAC is the only heat-generating equipment in the rack, allow at least 4 inches (10 cm) between the back of the rack and a solid wall. Otherwise, allow at least 6 inches (15 cm). Take care that other equipment does not blow hot air into the front and side air intakes on the BAC.

- **Power**

  The BAC operates from a standard CO 48 VDC power supply (or, for the model 8820-A2-530 only, a 48 or 60 VDC power supply). The power source wires must be 8 AWG, solid or stranded.

- **Grounding**

  A copper lug connector is attached to the back cover of the chassis near the bottom-center area. It accepts 8 AWG wire for grounding, which meets NEBS requirements.

- **Card Installation**

  It is recommended that you install BAC cards in contiguous slots to simplify the use of the multislot filler panels. Make sure that any empty slots are covered.

- **Cabling**

  Use only CAT3 or greater twisted-pair network connection cables for DSL connections and interface patch cabling. Untwisted analog cables of any length anywhere in the loop substantially contribute to crosstalk and reduced loop reach.

  If there is adequate maintenance space at the rear of the rack, mount the chassis on the rack before installing cables. If not, install the rear-mounted network cables on the chassis before mounting the chassis on the rack.

  The following customer-provided cables and cable adapters are required with this product:

  — Telco-type 50-pin cable with end-fed (or right angle) plug connectors for connection to the CO POTS splitter card or MDF. (See table of pinouts in *Telco 50-pin Connector Pinouts for DSL Loops and POTS Splitters* in Appendix A, *Pinouts*, for DSL ports for each DSL slot.) You could need a maximum of 17 cables for the rear connectors, depending on the mix of DSL port cards installed in your chassis. See *Installing Network Tip and Ring Connections* in Chapter 3, *Cabling: Line Card Tip and Ring*.

  — 8-pin modular plug cable for connection to a CO alarm system, if required.

  — 8-pin shielded CAT5 modular cable is required for connection to the DSL 10/100BaseT Ethernet ports. You will need this cable for each RADSL, IDSL, Packet SDSL, ReachDSL, and MVL card in the BAC. For ATM SDSL, TDM SDSL ,and TDM SHDSL cards, refer to the appropriate card Installation Instructions for the correct cable needed.

  — 8-pin UTP (unshielded twisted pair) CAT5 modular cable may be used for connection to management domain LAN for SNMP management system or Telnet access. However, shielded cable is recommended.

  — A serial cable and DB25 and DB9 adapters are supplied with the MCP card. For connection to a modem, you also need a null modem adapter.

  — A suitable cable is required for the ATM uplink. For example, 75-ohm coax cable is required for DS-3, and fiber cable is required for OC-3.

  CAUTION:

  Use of any nontwisted pair wiring arrangements, such as jumpers, can cause reduction in overall DSL reach performance, even over short distances.

Unpacking the Hardware

When shipped, the 8820 BAC is packed in a cardboard shipping container. Carefully remove the chassis from its shipping container and check for physical damage. If the chassis shows signs of shipping damage, report this immediately to your shipping and sales representatives.

NOTE:

The BAC weighs approximately 49 pounds empty.

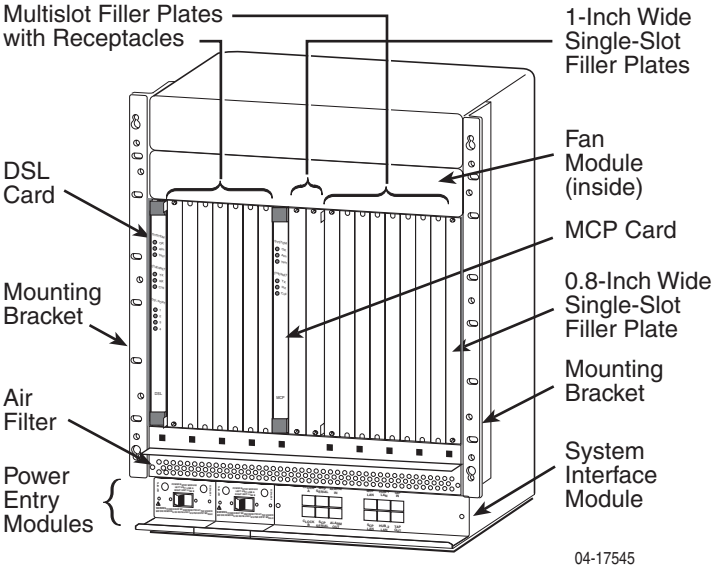
Package Contents

The 8820 BAC consists of the following components (all of which are already installed in the chassis):

- 1 chassis with backplane
- 2 mounting brackets (attached to chassis)
- 1 Internal Air Filter
- 2 Power Entry Modules (PEMs)
- 1 System Interface Module (SIM)
- 1 Fan Tray Assembly
- 2 multislot filler plates covering 16 slots (Slots 1–8 and 10–17)
- 2 filler plate receptacles attached to the multislot filler plates
- 4 single filler plates covering Slots 9, A, B, and 18
- 2 cable management brackets (attached to chassis in the shipped or stored position)

NOTE:

The BAC requires an SCP card and at least one line card for minimum functionality. These cards are not provided with this product and must be ordered separately.



In addition, each chassis is shipped with the following:

- Associated hardware bundled in a plastic bag:
  - 4 #10-32 mounting screws
  - 4 #12-24 mounting screws and 4 #12-24 self-retaining nuts (for use with racks without threaded mounting holes)
  - 18 large cable bushings for use with the 18 rear-mounted connectors
  - 4 small cable bushings
  - 5 wire ring tongue terminals for use with the power source wires
  - 18 cable ties to attach the Tip and Ring cables to line cards (should locking pivot brackets not be used)
- Additional hardware in a separate plastic bag:
  - 18 locking pivot brackets and screws for use with the customer-provided cables used on the rear of the chassis

Be sure to register your warranty at **www.paradyne.com/warranty**.

Before installing the 8820 BAC, read the *Important Safety Instructions* in the beginning of this document.

Mounting Configurations

The 8820 BAC comes equipped with mounting brackets to support installation in 19-inch (48.3 cm) Electronic Industries Association (EIA)-type or 23-inch (58.4 cm) NEBS-type racks. Installation of the 8820 chassis in a European Telecommunication Standards Institute (ETSI)-type rack requires a different set of custom mounting brackets.

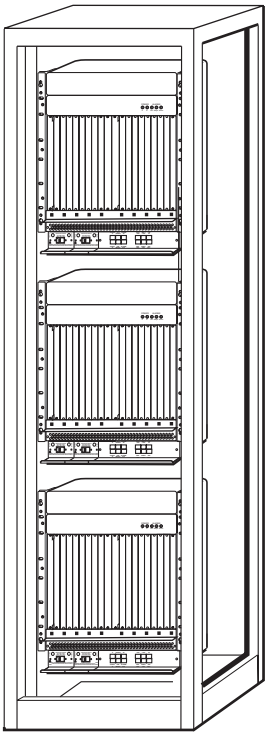
The following figure depicts an example of a chassis mounting configuration with three chassis in a rack.

CAUTION:

Although three BACs will fit into one rack, be sure that after all circuit cards are installed, the final configuration does not exceed NEBS heat release requirements. The NEBS requirement for a rack of this size is 181.2 watts per square foot. When using a standard transmission bay (12 inch-deep frame), the footprint is 7 square feet. This equals 1268 watts maximum per frame or rack when used in a NEBS location.

NOTE:

In this guide, the term *rack* refers to a CO rack, cabinet, frame, or bay.



Three BACs in a Rack

04-17546

Chassis Installation

You will need a Phillips screwdriver to install the 8820 BAC into a commercial EIA-standard 19- or 23-inch rack.

For both the 19- and 23-inch wide rack, the chassis can be installed in one of four depth positions: front flush-mount, 1-inch (2.54 cm) setback, 3-inch (7.62 cm) setback, or 5-inch (12.7 cm) setback. The chassis is shipped for a 19-inch rack with a 1-inch setback.

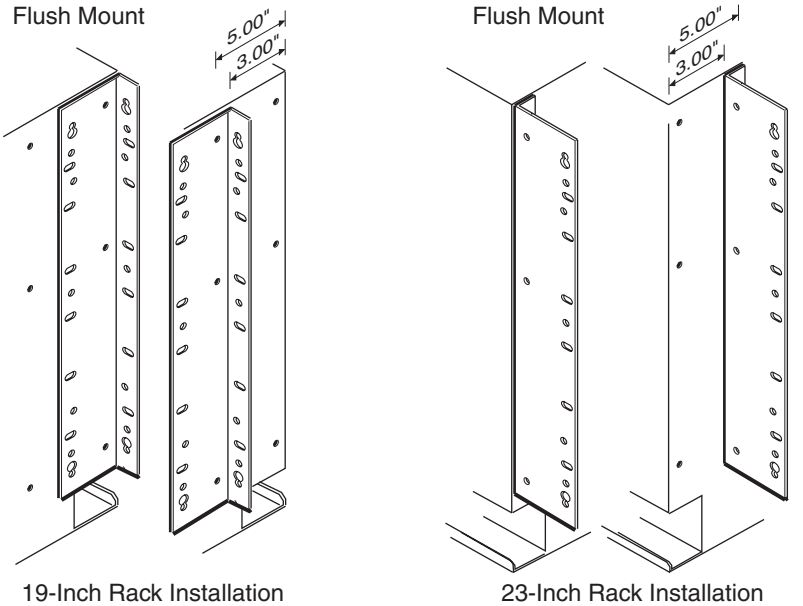
The rack that the chassis will be installed in may or may not have threaded screw holes. If not, you can use the #12-24 screws and self-retaining nuts provided with the chassis.

Mounting Brackets Configuration

The chassis is equipped with reversible mounting brackets installed on the chassis with a 1-inch setback and configured for a 19-inch rack. You may reposition them for a flush, 3-inch or 5-inch setback, and/or reconfigure them for a 23-inch NEBS-type rack.

Positioning the Mounting Brackets

The mounting brackets are L-shaped. For 19-inch EIA-type racks, the long leg of the bracket is secured against the chassis as shown below (left). For 23-inch NEBS-type racks, the short leg is secured against the chassis as shown below (right).



Changing the Setback Position of the Mounting Brackets

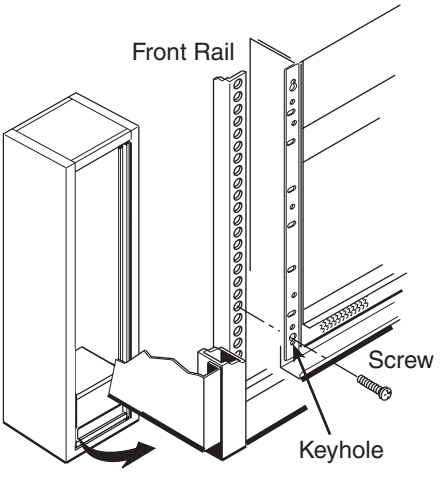
The setback position of the mounting brackets may be changed from the shipped 1-inch setback position to the flush, 3-inch, or 5-inch setback positions by removing the mounting brackets' three screws, repositioning the mounting brackets, then reinstalling the three screws.

▶ Procedure

To change the position of the mounting brackets:

1. Remove the screws (three on each side) that hold the mounting brackets to the chassis.
2. Reposition the brackets for the desired setback (flush, 1-inch, 3-inch, or 5-inch). (Refer to procedures for reversing brackets if installing in a 23-inch rack in *Positioning the Mounting Brackets* on page 2-6.)
3. Replace and tighten the three screws on each side to attach the brackets in the setback position.
4. Follow the procedures for installing the chassis in a 19- or 23-inch rack in *Installation into a 19-Inch or 23-Inch Rack* on page 2-8.

Installation into a 19-Inch or 23-Inch Rack



Front of 19-inch Rack

00-15324a-02

▶ Procedure

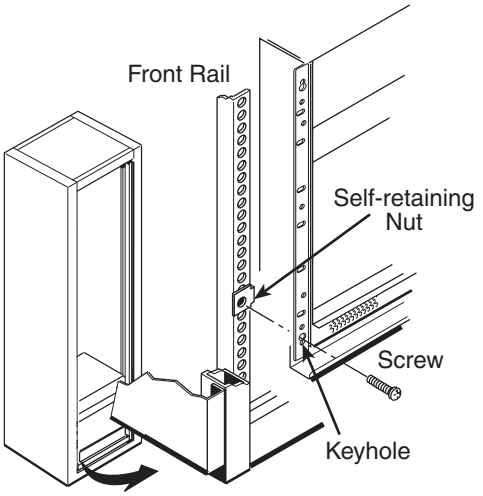
To install the chassis in a rack:

1. Determine the preferred placement of the chassis in the rack. The chassis is 24.5 inches high (14U, where 1U is 1.75 inches or 44.45 cm). The center of the first mounting holes on each side of the chassis is 1.484 inches (3.77 cm) from the top of the chassis. Mark the appropriate locations for the two upper mounting screws on each side of the rack.
2. Use the screwdriver to install two screws loosely enough to allow the bracket keyholes to drop over the screw heads during installation.
3. Place the chassis against the front rails of the rack allowing the installed mounting screws to pass through the keyholes. Lower the chassis into place, allowing the keyholes to slide under the screw heads.

   This action positions the chassis correctly for installation.
4. Install the remaining three mounting screws for each bracket and tighten all screws.

Install the next chassis in the same manner.

Installation into a Rack without Threaded Screw Holes



Front of 19-inch Rack

02-15324b-02

▶ Procedure

To install the chassis in a rack that does not have threaded screw holes:

1. Determine the preferred placement of the chassis in the rack. The chassis is 24.5 inches (62.2 cm) high. The top mounting hole is 1.484 inches (3.77 cm) from the top of the chassis. Mark the appropriate locations for the machine screws on the rack.
2. Slip a self-retaining nut onto each rail hole selected and align the hole of the self-retaining nut with the hole in the rail.
3. Line up the chassis mounting bracket with the self-retaining nut and start to rotate the self-retaining nut screw into the chassis mounting bracket and the self-retaining nut. Start all screws, then tighten all screws until each screw head is flush with the chassis and is securely mounted in the rack.

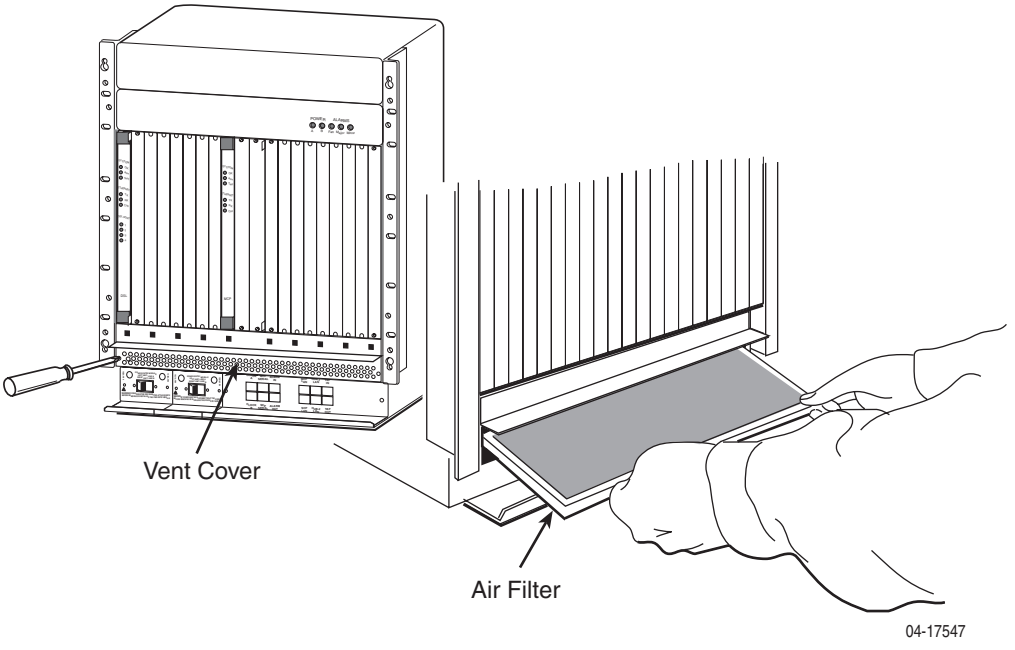
Installing the Air Filter

The BAC is shipped with an air filter. The air filter prevents dust from entering the chassis. If this air filter is not already installed in the chassis, use the installation procedure below. Once it is installed, you should inspect and replace the air filter at least once a year. A harsh environment will require more frequent filter changes. To purchase a replacement air filter, contact your sales representative.

▶ Procedure

To install the air filter:

1. Unfasten the screws on the vent cover and remove it.
2. The air filter mounts at an angle within the chassis. Slide the air filter upwards into the air filter guides located on the inside of each side wall. Slide the filter upwards until it seats against the foam strip located on the backplane.



NOTE:

When oriented properly, the vertical arrows on the front and rear edges of the filter point up.

3. Replace the vent cover plate, ensuring that the plate's foam strip presses against the front of the filter.
4. Replace the screws.

Connecting Power

The BAC is furnished with two internally mounted circuit breakers for redundant power (PWR A and PWR B). Two separate, unswitched, individually fused power sources, each capable of safely handling this load, are required for power redundancy.

The chassis provides either front or rear power access connections. Rear power access is recommended due to ease of installation. Selecting the rear power access method also eliminates the need for routing large 8-gauge wires to the PEMs on the front of the chassis. The PEMs contain circuit breakers, isolation, and other power conditioning-type circuitry and are always required for operation, even if rear power access wiring is installed.

⚠ WARNING:

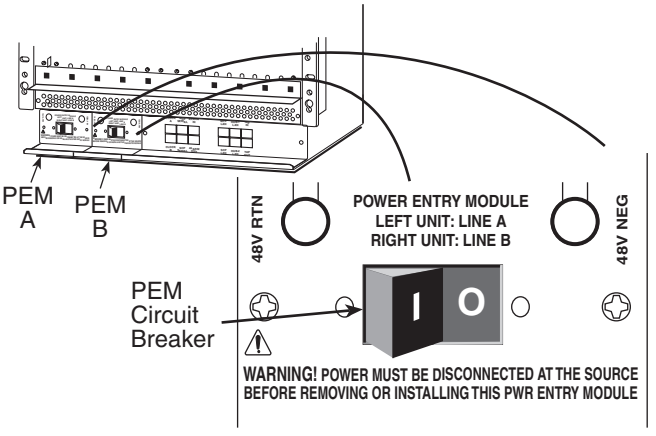
While power connections can be made to either the front or the rear of the chassis, they must not be made to both at the same time.

Front Power Access

Front power access is made via two PEMs which are located in the front, lower left side of the chassis. PEM A is located on the left, while PEM B is on the right.

NOTE:

Both PEMs must be powered, or else the management card alarm will activate.



The DC power wiring requires the use of #8 AWG stranded wires. Use the following procedure to connect power to the front.

⚠ WARNING:

- **It is recommended that the following procedure be performed by a qualified electrician.**
- **The DC power must be disconnected at its source before attempting to connect wiring to the PEM. Wired PEMs should never be removed without first disconnecting the power at its source.**

▶ Procedure

To connect power to the front of the chassis:

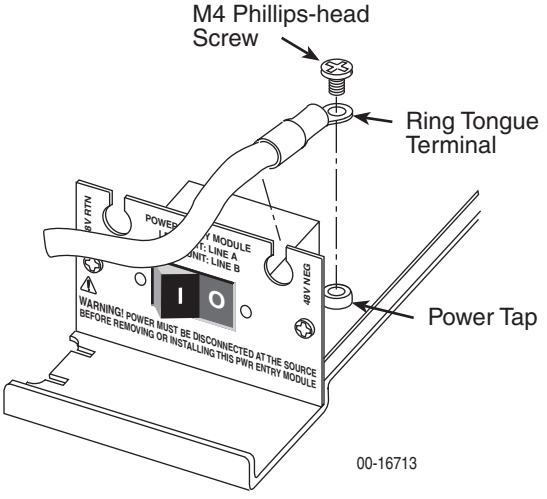
1. Apply the supplied compression-type ring tongue terminals to the #8 AWG power wires. Use the Molex MagnaCrimp Hand Tool (Part No. MCT-8200).
2. Remove the PEM to be wired from the chassis by unfastening the two screws from the PEM faceplate. Save these screws since they will be needed when the wired PEM is reinstalled into the chassis (see Step 7).
3. Remove the two M4 Phillips-head screws installed in the power taps located on the left and right side of the PEM wiring board. Also remove the two split cable bushings from the PEM faceplate if they are installed.

4. Fasten the #8 AWG wires, with their ring tongue terminals properly installed (see Step 1), to the power taps using the M4 Phillips-head screws.

   — Connect the negative wire to the power tap on the right (**48V NEG** is printed on the front of the PEM's faceplate).

   — Connect the return or positive wire to the power tap on the left (**48V RTN** is printed on the front of the faceplate).

   Tighten the M4 screws securely to the power taps while keeping the ring tongue terminals and their wires dressed parallel to the board and perpendicular to the faceplate.



5. Feed and dress the power wires through the notched holes at the top of the PEM's faceplate.

6. Slightly spread open the split cable bushings and slip them over the wires and into the holes at the top of the faceplate. Press on the cable bushing to snap it into the faceplate.

7. Reinstall the PEM into the chassis using the mounting screws removed in Step 2.

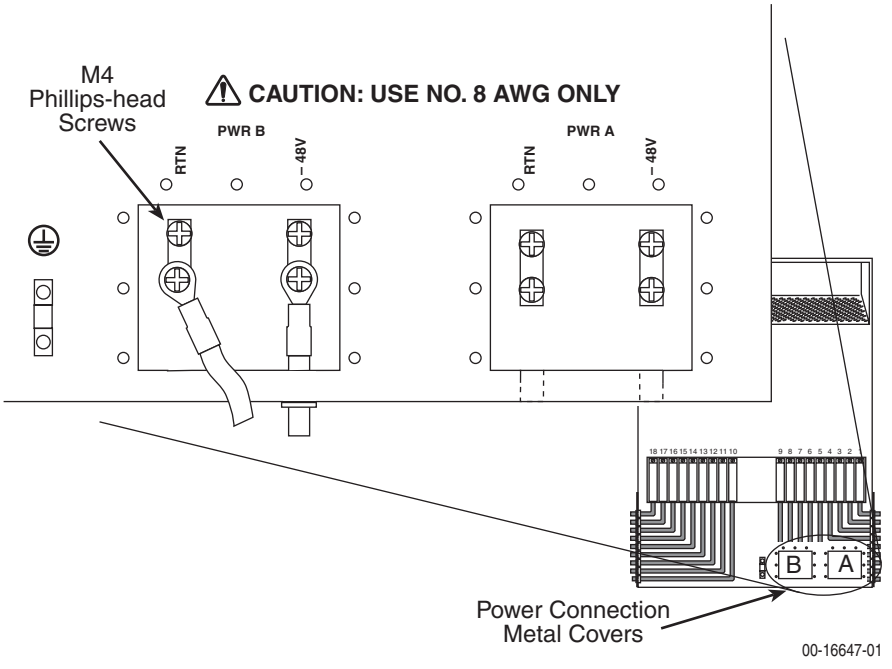
8. Repeat the above steps for the remaining PEM.

9. Cable ties may be used to secure the power wiring to the PEM brackets.

Rear Power Access

⚠ WARNING:

- **It is recommended that the following procedure be performed by a qualified electrician.**
- **Never remove the metal cover(s) without first ensuring that the power has been disconnected at the source.**
- **When installing or servicing rear access power connections, never remove both metal covers at the same time to avoid exposure to 48 or 60 VDC potentials.**



NOTE:

Both PWR A and PWR B must be powered, or else the management card alarm will activate.

▶ Procedure

To connect power to the rear of the chassis:

1. Apply the supplied compression-type ring tongue terminals to the #8 AWG power wires. Use the Molex MagnaCrimp Hand Tool (Part No. MCT-8200).
2. Remove the left or right metal cover on the lower, rear of the chassis. The left metal cover is for **PWR B** power connections, and the right metal cover is for **PWR A** power connections. Ensure that the insulator attached to the back of the metal cover does not pull loose; it must be intact when you reinstall the cover plate (see Step 8).
3. The rear access power wiring can be routed from the power taps directly downward and out of the bottom of the chassis (perpendicular to the metal covers) or straight through the cover plate. After deciding which routing path to follow, use long nose pliers (or the equivalent) to remove the metal knock-out from the bottom of the chassis or the metal cover.
4. Route the rear access power wires either up through the bottom of the chassis or straight through the cover plate.
5. Remove the two M4 Phillips-head screws installed in the power taps on the backplane.
6. Dress the power wires, with the ring tongue terminals attached in Step 1, through the appropriate access holes. Attach the #8 AWG wires to the power taps using the M4 Phillips-head screws from Step 5.
   - — Connect the return or positive wire to the power tap on the left (**RTN**).
   - — Connect the negative wire to the power tap on the right (–**48V**).

   Tighten the M4 screws securely while keeping the ring tongue terminals and their wires dressed vertically.
7. If power wiring is dressed through the bottom of the chassis, install the small cable bushings (supplied). Spread the cable bushing open slightly and slip it over the power wire. Slide the bushing upward into the cable access holes in the bottom of the chassis and press on the bushing until it snaps, locking it in place.
8. Reinstall the metal cover removed in Step 2.
9. Repeat this procedure for the other metal cover.

Insertion or Removal of the PEMs

⚠ WARNING:

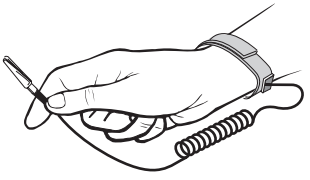
If both PEMs are being supplied with power from the front of the chassis, make sure that power to the PEM is OFF, and the PEM circuit breaker is open, before attempting to remove the PEM.

If both PEMs are supplied power from independent power sources from the front of the chassis, then either PEM can be removed without affecting service.

If both PEMs are supplied with power from the rear of the chassis, then either PEM can be removed without affecting service by first turning off its circuit breaker before removal, then turning its circuit breaker back on after insertion.

Populating the BAC

⚠ HANDLING PRECAUTIONS FOR STATIC-SENSITIVE DEVICES



This product is designed to protect sensitive components from damage due to electrostatic discharge (ESD) during normal operation. When performing installation procedures, however, take proper static control precautions to prevent damage to equipment. If you are not sure of the proper static control precautions, contact your nearest sales or service representative.

NOTE:

The BAC is equipped with an ESD jack located near the upper-right corner on the front of the chassis.

If used:

- An SCP card must be installed in Slot A or Slot B. For redundancy, an SCP card may be installed in both Slot A and Slot B.
- An MCP card must be installed in Slot 9.
- An SCM card must be installed in Slot A.

Line cards can be installed in any one of Slots 1 through 9 and 10 through 18. However, if you have only one line card, it is recommended that you begin with Slot 1.

NOTE:

It is important to completely secure each card in place before installing the next card (tighten upper and lower screws). This is required to ensure proper pressure on the EMI gaskets and to maintain proper air flow.

Filler Plates and Cards for the BAC

Slot #	Is Shipped with . . .	And Can Accept These Cards . . .	For Installation Instructions, See . . .
1–7 10–16	Two multislot filler plates (left, covering Slots 1–7, and right, covering Slots 10–17)	Line Card	*Installing Line Cards into Slots 1–7 and 10–17* on page 2-20
8 and 17	Single filler plate with receptacle for multislot filler plate edge	Line Card	*Installing Line Cards into Slots 8 and 18* on page 2-24, or *Installing Line Cards into Slots 1–7 and 10–17* on page 2-20
9	Single 0.8-inch (2.03 cm) filler plate with EMI gasket	Line Card or MCP Card	*Installing a Line Card into Slot 9* on page 2-24, or *Installing an MCP Card* on page 2-19
18	Single 0.8-inch filler (2.03 cm) plate with EMI gasket	Line Card	*Installing Line Cards into Slots 8 and 18* on page 2-24
A	Single 1-inch (2.54 cm) filler plates with EMI gaskets	SCP Card or SCM Card	*Installing an SCP Card* on page 2-18 or *Installing an SCM Card* on page 2-26
B	Single 1-inch (2.54 cm) filler plates with EMI gaskets	SCP Card	*Installing an SCP Card* on page 2-18

All circuit cards except the active SCP card or SCM card may be replaced without disruption to user data (that is, you can remove and reinstall a card without powering down the chassis and disrupting user data on the other cards). To remove the card from the base chassis, unfasten the screws on both ends of the faceplate. Then push both ejector handles outward and slide the card out.

NOTE:

When swapping DSL port cards, it is important to note that in the BAC, the Media Access Control (MAC) address (also referred to as the physical address) for each slot is stored in the System Interface Module (SIM). A replacement DSL port card will be assigned a MAC address for the slot as stored in the SIM. Replacing the SIM will result in a new MAC address being assigned to all slots.

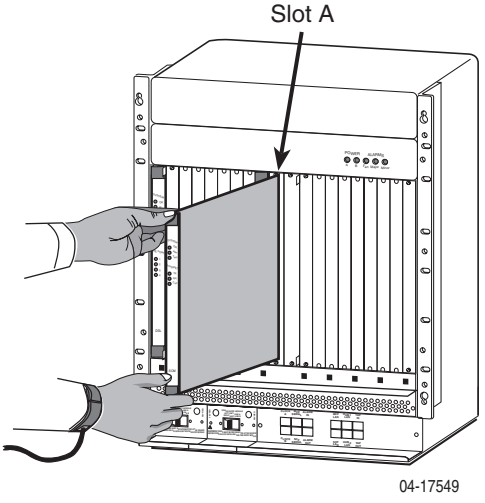
Installing an SCP Card

SCP cards can be installed in Slot A, Slot B, or both Slot A and Slot B.

▶ Procedure

To install the SCP Card in Slot A or Slot B:

1. If there is a filler plate covering the slot, remove it.
2. Remove the yellow screw covers.
3. Insert the card into the card guides of the slot on the chassis.



4. Carefully slide the card into the slot until the card meets the connectors on the backplane. Then press in on the insertion/ejection levers until the card is fully seated.
5. Verify that the SYSTEM Active or Standby indicator on the card's faceplate is cycling off and on. See *Verifying the Installation* on page 2-27.
6. Secure the card by fastening the screws on each end of the faceplate. This is required to maintain proper gasket pressure on the faceplate as well as proper air flow.

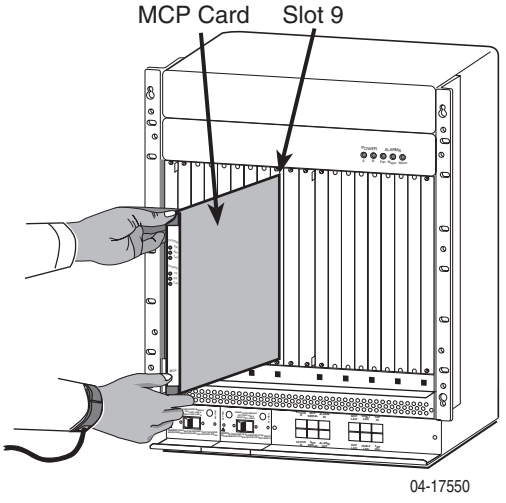
Installing an MCP Card

Use a flat-blade or Phillips screwdriver to install an MCP card into Slot 9.

▶ Procedure

To install an MCP card:

1. Remove the single filler plate from Slot 9 and store it for future use.



2. Position the MCP card vertically and insert it into the top and bottom card guides of Slot 9.
3. Slide the MCP card into the slot. Gently but firmly push the card until it properly seats in its mating connectors on the backplane.

CAUTION:

Do not force the MCP card into the slot. If it does not seat properly, remove the card and reinstall it. If it still does not seat properly, call for service.

4. The MCP card will now perform a power-on self-test. All of the LEDs turn ON and OFF briefly. When the self-test is completed successfully, the SYSTEM OK LED will turn ON. Make sure the OK SYSTEM indicator on the MCP faceplate is ON (blinking green).
5. Secure the MCP card by tightening the top and bottom screws on the faceplate. This is required to ensure proper pressure on the EMI gaskets and to maintain proper air flow.

Installing Line Cards into Slots 1–7 and 10–17

If you are installing only one line card in the BAC, it is recommended that you use Slot 1 first, and then proceed to fill the other slots in ascending numerical order (2–9 and 10–18). When you get to Slots 8 and 18, see *Installing Line Cards into Slots 8 and 18* on page 2-24. Whenever you are installing additional line cards, you must ensure that a filler plate covers the remaining empty slots.

Filler Plate Removal, Adjustment and Reinstallation

The BAC comes with the following filler plates installed:

- Two single, 0.8-inch (2.03 cm) wide, EMI-gasketed filler plates (for Slots 9 and 18)
- Two single, 1-inch (2.54 cm) wide, EMI-gasketed filler plates (for Slots A and B)
- Two receptacle filler plates (for Slots 8 and 17)
- Two multislot filler plates (for Slots 1–7 and 10–16)

If you are installing line cards in Slots 1–8 or 11–17, you need to remove a multislot filler plate. After installing the card, you need to adjust the remaining portion of the filler plate according to the number of cards being installed, and then reinstall the filler plate. The following table of procedures in *Filler Plates for the BAC* on page 2-21 will serve as a reference.

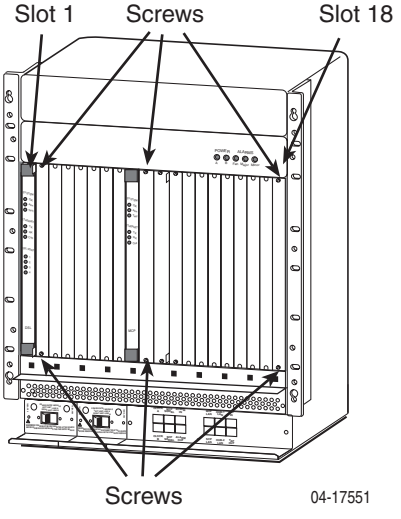
Filler Plates for the BAC

If You Are Populating . . .	Then . . .
Slots 1–7 and 10–16	1. Remove the multislot filler plate from the chassis. 2. Break away as many panels as needed. 3. Reinstall the filler plate to cover remaining empty slots. 4. Make sure the attached receptacle covers the broken edge. 5. Make sure the EMI gasket is on the side of the filler panel that is opposite the receptacle.
Slots A–B, 9 and 18	Remove the single EMI-gasketed filler plate. Store for future use.
Slots 8 and 17	Remove the single filler plate with receptacle and install EMI-gasketed filler plate.

▶ Procedure

To remove the multislot filler plate:

1. Remove the screws fastening the filler plate to the chassis.



2. Lift the filler plate away from the chassis.

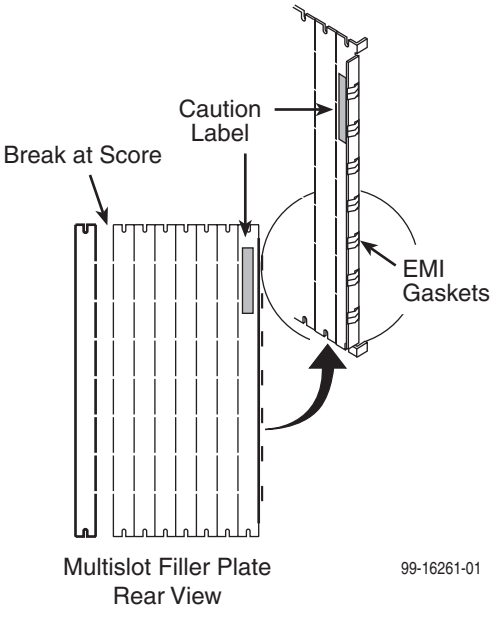
▶ Procedure

To adjust the multislot filler plate to cover empty slots:

CAUTION:

Breakaway may cause sharp edges and burrs. Use due care.

1. Count the number of line cards that you will be installing.
   - — If you are installing fewer than 8 cards, go to Step 2.
   - — If you are installing cards in Slots 1–8 or 10–17, remove the appropriate multislot filler plate (use tabs provided).
2. From the side of the multislot filler plate without the EMI gaskets, break away as many panels as needed.



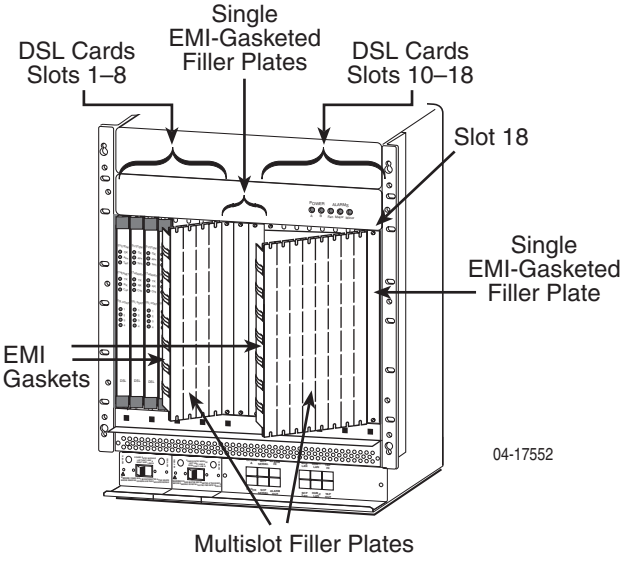
NOTE:

Be sure to break off panels from the side of the filler plate opposite the EMI gaskets. The edge with the the EMI gaskets is needed to create a good EMI seal with the card in the slot to the left of the filler plate.

▶ Procedure

To install line cards and reinstall the multislot filler plate:

1. Install a line card into the slot. It is recommended that you install BAC cards in contiguous slots to optimize the cabling. Covering empty slots is required to maintain EMI shielding and proper cooling.
2. Verify that the LEDs show proper operation (see *Verifying the Installation* on page 2-27).
3. Tighten the screws to fasten the card to the chassis. It is recommended that slight pressure be applied to the faceplate toward the left as you are tightening the card screws. This will insure a good board-to-board EMI seal.
4. Repeat Step 1 through Step 3 for each line card being installed.
5. Slip the right side of the multislot filler plate (side without the EMI gaskets) into the receptacle as shown below.



6. Ensure that a good EMI seal is made with the EMI gaskets on the left side of the multislot filler plate by applying slight pressure to the left.
7. Replace the screws in the multislot filler plate to fasten it to the chassis.

Installing Line Cards into Slots 7 and 16

When you are ready to install a line card into Slot 7, you must remove the multislot filler plate and the receptacle filler plate. You can use the single EMI-gasketed filler plate removed from Slot 9 to cover empty Slot 8. Make sure the EMI gasket is on the side of the filler panel that is opposite the receptacle. Use the same procedure when installing a card into Slot 16. Once Slot 8 is filled, the filler plate used to cover it can later be used to cover empty Slot 17. Whenever you are installing additional line cards, you must always ensure that a filler plate covers the remaining empty slots. This is necessary for EMI shielding and proper cooling.

Installing a Line Card into Slot 9

Remove the single EMI-gasketed filler plate from Slot 9 and store it for possible later use. Proceed with Step 2 on page 2-25.

Installing Line Cards into Slots 8 and 18

If you are installing only one line card in your BAC, it is recommended that you install it in Slot 1. However, if you have used all your other DSL slots (1–7 and 10–17), you can then install the last cards in Slots 8 and 18. **Do not install line cards into Slot A or B.** If you are installing more than one line card, see *Installing Line Cards into Slots 1–7 and 10–17* on page 2-20.

Use a Phillips screwdriver to install the line card.

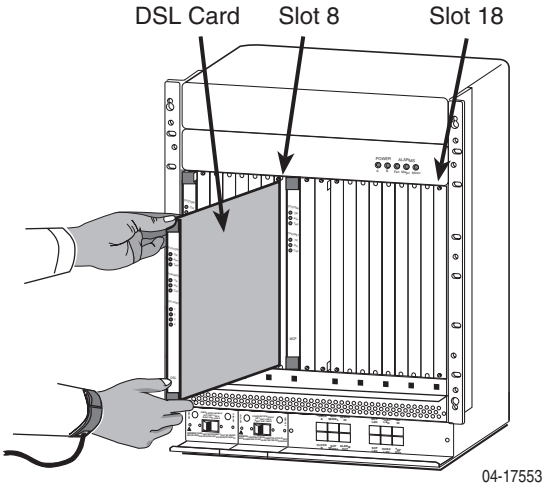
NOTE:

Do not discard the unused single filler plate covering Slot 18. Each slot in the chassis must contain a circuit card or be covered with a filler plate. Store all unused filler plates in a safe place. You may need to use the filler plates to cover open slots in the chassis at a later time. Covering empty slots is required to maintain EMI shielding and proper cooling.

▶ Procedure

To install a line card:

1. If you are installing the line card into Slot 18, remove the single filler plate and store it in a safe place. If you are installing a line card into a slot other than Slot 8 or 18, see *Installing Line Cards into Slots 1–7 and 10–17* on page 2-20 before continuing with this procedure.
2. Hold the line card vertically and insert it into the top and bottom card guides of the desired slot. For example, insert the card into Slot 8 as illustrated below.



3. Slide the line card into the slot. Gently but firmly push the card until it properly seats in its mating connectors on the backplane.

CAUTION:

Do not force the line card into the slot. If it does not seat properly, remove the card and reinstall it. If it still does not seat properly, call service.

4. The line card will now perform a power-on self-test. All of the LEDs turn ON and OFF briefly. When the self-test is completed successfully, the SYSTEM OK LED will turn ON. Make sure the SYSTEM OK indicator on the line card faceplate is blinking green.

   For a more detailed explanation of LEDs on the line card, refer to the appropriate line card documentation.

5. Secure the line card by tightening the top and bottom screws on the faceplate while applying slight pressure to the left to insure a good seal. This is required to maintain proper gasket pressure on the faceplate.

NOTE:

If a new line card is not installed in this slot, a gasketed, single filler plate must be installed to provide shielding and proper air flow.

Installing an SCM Card

An SCM card cannot coexist in the same chassis as an SCP card. It is used to support legacy ATM cards.

Use a small- to medium-size flat-blade or Phillips screwdriver to install the SCM card into Slot A. SCP and SCM cards are equipped with lever-type latches that assist in both the insertion and removal of the card. All the rest of the cards are equipped with ejector-type latches.

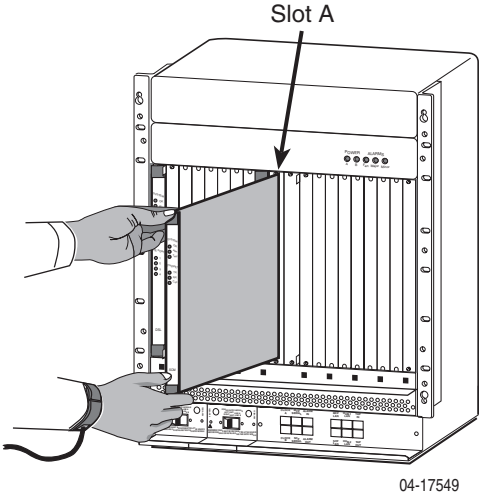
▶ Procedure

CAUTION:

Do not insert the SCM card into any slots other than A, as this will damage the BAC.

To install an SCM card:

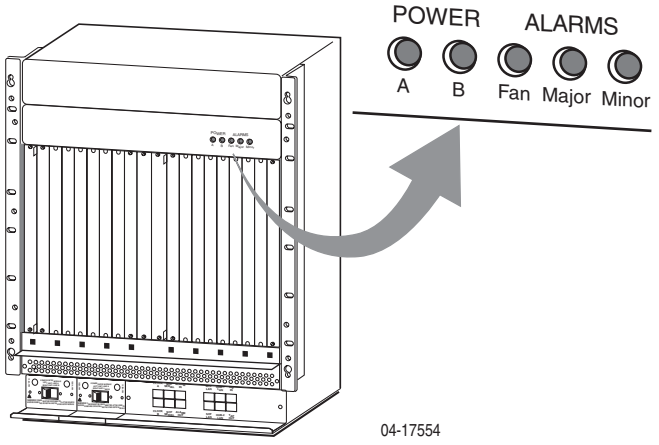
1. If there is a filler plate covering Slot A, remove it.
2. Hold the SCM card vertically and insert it into the top and bottom card guides of Slot A.



3. Carefully slide the card into the slot. Lift the insertion/ejection latches away from the faceplate until the card begins to engage the connectors on the backplane. Then press in on the latches until the card is fully seated.
4. Verify that the OK SYSTEM indicator on the card's faceplate is blinking green.
5. Secure the card by fastening the screws on each end of the faceplate. This is required to maintain proper gasket pressure on the faceplate, as well as proper air flow.
6. Attach the appropriate cables to the connectors protruding through the SCM faceplate.

Verifying the Installation

To verify the hardware installation, observe the front panel indicators.



In normal operation:

- The POWER A LED and/or the POWER B LED are in the ON state (green).
  - — If you are using dual power sources, both Power LEDs must be ON.
  - — If you are using a single power source, the appropriate Power LED (either Power A or Power B) must be ON.
- The FAN ALARM LED must be OFF.
- If you installed an SCP card, verify that the SYSTEM ACTIVE or STANDBY LED is cycling off and on.
- If you installed an MCP or SCM card, verify that the SYSTEM OK LED is cycling off and on.
- Verify that the SYSTEM OK LEDs on any line cards are cycling off and on.

If these LEDs fail to appear as described, see *Troubleshooting Table* and *LEDs* in Chapter 6, *Troubleshooting*, for more information.

Cabling: Line Card Tip and Ring

3

Installing Network Tip and Ring Connections

Line cards connect to the network through connectors mounted on the back of the BAC. Each slot has its own 50-pin connector wired to it and is capable of supporting high-density cards with up to 25 ports.

The network Tip and Ring cables must be equipped with end-fed plug connectors. Each connector has a captive screw at one end and a tapped hole in the plastic at the other end. The connector's captive screw must be replaced with a shorter one supplied with the chassis. You can attach the cable to the chassis using the cable ties provided or you can use the locking pivot brackets provided. See *Connecting a Line Card Using Cable Ties* or *Installing Locking Pivot Brackets* on page 3-2.

⚠ EMI NOTICE:

In order to maintain compliance with Part 15, FCC Rules and other EMI requirements, certain line cards require the installation of the supplied ferrite choke on the 50-pin telephone network cable where it connects to the BAC. The choke (Part No. 175-0018-0031) and its installation instructions are provided with the cards.

Before installing the network connectors, the correct slot must be identified. The connectors are labeled **1–18,** from right to left, on the back of the chassis. This corresponds with the 18 slots for circuit cards. The cable for the first slot is installed in the connector identified as **1**, and so on.

Connecting a Line Card Using Cable Ties

▶ Procedure

To connect a line card in the 8820 BAC using the provided cable ties:

1. On each cable, replace the longer captive screw on the cable connector with the #4-40 Phillips pan-head screw shipped in a plastic bag with the unit. Do not insert the screw past the connector body until Step 4.
2. Plug the Telco 50-pin cable into the appropriate connector for the slot containing the card (labeled 1–18) on the rear of the 8820 chassis.
3. Thread the provided cable tie through the anchor mount on the end of the connector where the cable will lie. Tighten the cable tie around the connector and cut off any excess.
4. Secure the other end of the Telco 50-pin cable by tightening the Phillips pan-head screw (that you replaced in Step 1) on the right side of the connector.
5. Make sure the other end of the cable is connected to the appropriate POTS splitter shelf, MDF, or demarcation point.

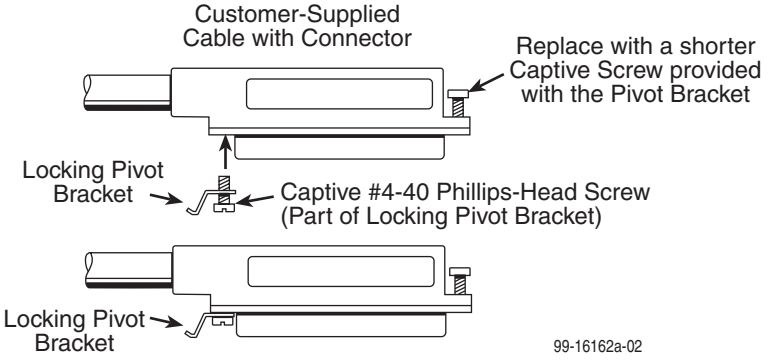
Installing Locking Pivot Brackets

The network Tip and Ring cables must be equipped with end-fed plug connectors. Each connector has a captive screw at one end and a tapped hole in the plastic at the other end. The connector's captive screw must be replaced with a shorter one and the locking pivot bracket must be installed on the other end, as shown in the following procedure.

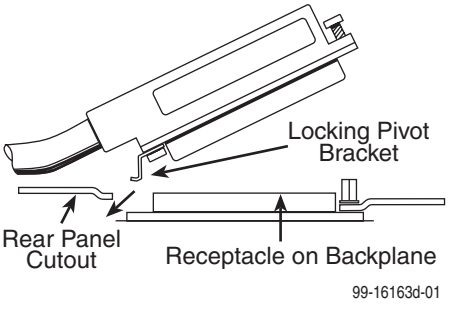
▶ Procedure

To install a locking pivot bracket:

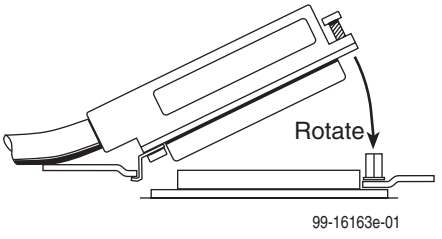
1. Install the locking pivot bracket onto the cable end of the connector using the captive screw, as illustrated below.



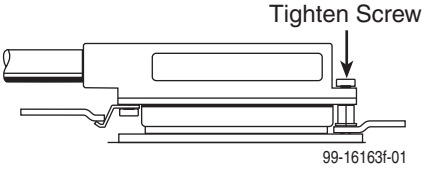
2. Insert the bottom edge of the locking pivot bracket inside the lower edge of the rear panel cutout.



3. Align the two connectors.
4. Rotate the connector until it is fully seated.



5. Tighten the captive screw on the top of the cable's connector to secure it to the insert mounted on the rear cover.



6. Repeat this procedure for the remaining connectors.

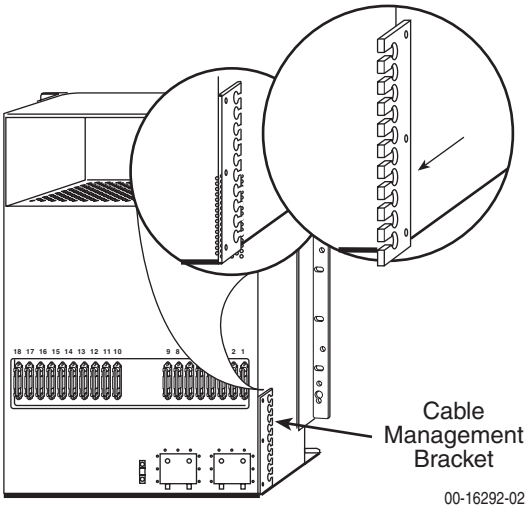
Cable Management Brackets

Two cable management brackets are attached to the rear sides of the BAC in the shipping position (with the open slots facing forward).

▶ Procedure

To install the cable management brackets:

1. Remove the screws (three on each) from the cable management brackets, and then remove the cable management brackets from the chassis. Reposition the brackets so that the open slots face the rear.



2. Reinstall the screws in the same holes to secure the brackets to the chassis.

When you have correctly installed the cable management brackets, ten slotted holes are exposed at each side to accept the cables and the bushings.

Split Cable Bushings

Eighteen split cable bushings are shipped with the BAC. These bushings keep the rear cables in place and protect them from being damaged by the cable management brackets.

▶ Procedure

To install the split cable bushings:

1. Dress the cable of connector 1 to the right and through the slotted hole that is second from the top (top hole is not used) of the cable management bracket.

   NOTES:

   — Cables from connectors 1 to 8: dress to the right.

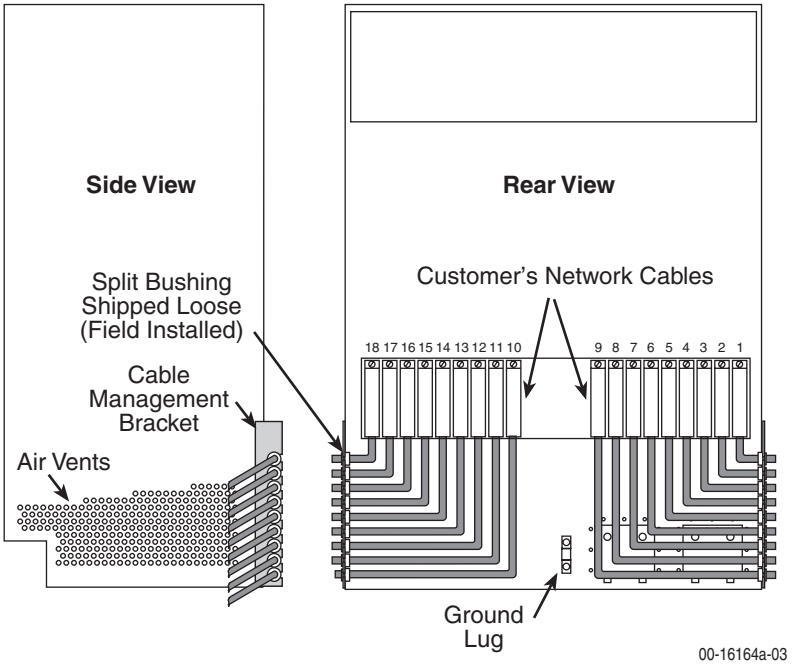
   — Cables from connectors 10 to 18: dress to the left.

2. Taking one of the split cable bushings, open the bushing and slip it over the cable on the outside of the cable management bracket.
3. Slide and snap the bushing into the slotted hole of the cable management bracket.
4. Repeat this procedure for each of the remaining cables.

When you have correctly installed the split cable bushing, it points toward the center of the chassis with the large diameter ring flush against the outside of the cable management bracket, holding the cable in place.

CAUTION:

Do not block the air vents on the side of the chassis with the cables.



Cabling: Standard SIM

4

Standard SIM

This chapter describes cabling for the standard System Interface Module (SIM), feature number 8820-S1-902, which has 24 8-pin ports:

- Clock A and Clock B – See *Connecting Clock Sources to Clock A and Clock B* on page 4-2
- Serial SCM – See *Connecting an SCP Card to a Terminal or PC* on page 4-4
- Serial MCP – See *Connecting an MCP Card to a Terminal or PC* on page 4-2
- Alarm – See *Connecting the Alarm Out Port to a CO Alarm System* on page 4-4
- LAN Slot 1–8, A–B, 12–18 – See *Connecting to the IPC, Ethernet Hubs, or Switches* on page 4-6

For cabling of the Test Access SIM, see Chapter 5, *Cabling: Test Access SIM*.

Connecting Clock Sources to Clock A and Clock B

Follow this procedure only if you want to use external BITS (Building Integrated Timing Supply) clocking in an SCP-based chassis. See *Clock A and Clock B* in Appendix A, *Pinouts*, for pinout information. See *Configuration - System Clock* in the SCP card's online Help for information about clocking and clock switching.

▶ Procedure

To connect the 8820 BAC to an external clock:

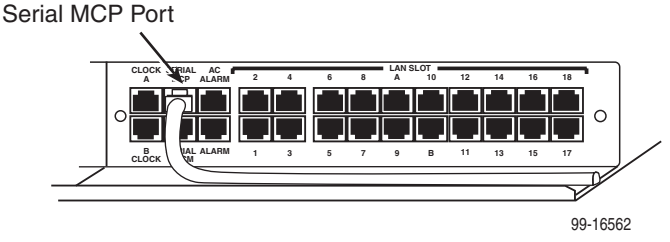
1. Plug the 8-pin modular cable into the Clock A or Clock B connector on the front of the 8820 chassis. The active SCP card has access to both connectors.
2. Connect the other end of the cable to the BITS clocking source.

Connecting an MCP Card to a Terminal or PC

▶ Procedure

To connect an MCP card to a terminal or PC:

1. Connect the serial cable with 8-pin modular plugs on each end (provided with the MCP card) into the SERIAL MCP port of the chassis.
2. Dress the cable to the right and through the cable retainer.



3. Plug the other end of the cable into the terminal or PC serial port, using the appropriate DB25 or DB9 adapter that is supplied with the MCP card.
4. Configure your terminal or terminal emulator with the following settings:
   - Baud Rate = 9600
   - Data Bits = 8
   - Parity = No Parity
   - Stop Bits = 1
   - Flow Control = None

Connecting to a Modem for Remote Management (with MCP)

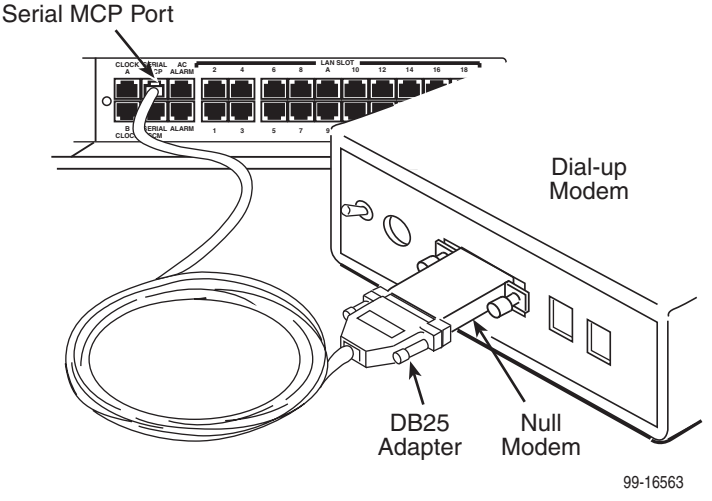
Before connecting the 8820 BAC to a standard AT dial-up modem, configure the modem with the following settings:

- Set the modem for auto answer. For example, ATS0=1.
- Turn off character echo. For example, ATE0.
- Enable result codes in originate mode only. For example, ATQ2.
- Set the modem to ignore Data Terminal Ready (DTR). For example, AT&D0.

▶ Procedure

To connect the 8820 BAC to a dial-up modem:

1. Plug a serial cable into the SERIAL MCP port of the chassis.
2. Dress the cable to the right and through the cable retainer.
3. Plug the other end of the cable into your modem's serial port using a DB25 adapter and a Null Modem.

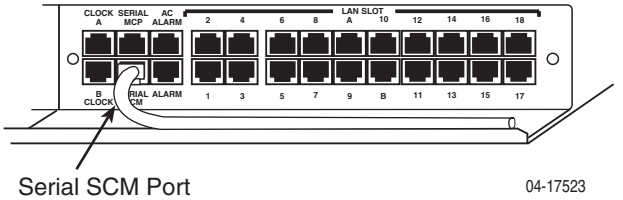


Connecting an SCP Card to a Terminal or PC

▶ Procedure

To connect an SCP card to a terminal or PC:

1. Connect the serial cable with 8-pin modular plugs on each end (provided with the SCP card) into the SERIAL SCM port of the chassis.
2. Dress the cable to the right and through the cable retainer.



3. Plug the other end of the cable into the terminal or PC serial port, using the DB9 adapter that is supplied with the SCP card.
4. Configure your terminal or terminal emulator with the following settings:
   - Baud Rate = 9600
   - Data Bits = 8
   - Parity = No Parity
   - Stop Bits = 1
   - Flow Control = None

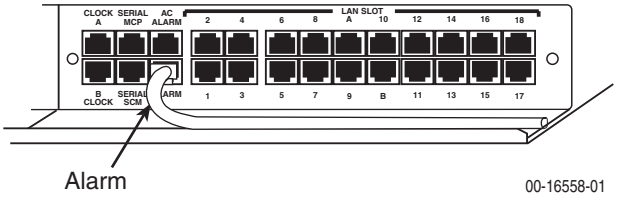
Connecting the Alarm Out Port to a CO Alarm System

The following procedure is optional. Follow this procedure only if you want to connect to a CO alarm system. See *Alarm Out Connector* in Appendix A, *Pinouts*.

▶ Procedure

To connect the 8820 BAC to a CO alarm system:

1. Plug an 8-pin modular cable into the ALARM port of the chassis.
2. Dress the cable to the right in the cable tray.



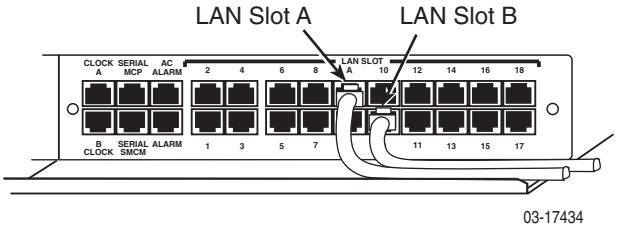
3. Remove the modular plug connector at the end of the cable (if any), strip the wires, and connect to the desired CO alarm system inputs.

Connecting an SCP Card to an SNMP Management System

▶ Procedure

To connect an SCP card to an SNMP management system:

1. Plug an 8-pin modular cable into LAN SLOT A or B of the SIM, according to which slot the SCP card is installed.
2. For a chassis with a redundant SCP card, a cable is required in both the LAN SLOT A and LAN SLOT B jacks of the SIM.



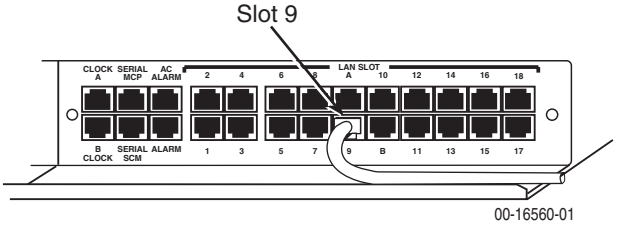
3. Dress the cable or cables to the right and through the cable retainer.
4. Plug the other end of the cable or cables into the 10/100BaseT hub connected to the SNMP management system network.

Connecting an MCP to an SNMP Management System

▶ Procedure

To connect an MCP card to an SNMP management system, or for Telnet access to the MCP card:

1. Plug an 8-pin modular cable into LAN Slot 9 of the SIM, which corresponds to the MCP card in Slot 9 of the chassis.



2. Dress the cable to the right and through the cable retainer.
3. Plug the other end of the cable into the 10/100BaseT hub connected to the SNMP management system network.

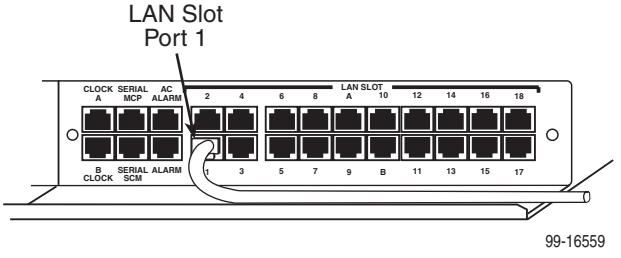
Connecting to the IPC, Ethernet Hubs, or Switches

Use this procedure for connecting RADSL, MVL, ReachDSL/MVL, IDSL, and SDSL cards to the IPC, Ethernet hubs, or switches. For other types of cards, refer to the appropriate Installation Instructions.

▶ Procedure

To connect the 8820 BAC to the IPC, Ethernet hubs, or switches:

1. Plug an 8-pin modular UTP CAT5 cable into LAN jack Port 1 for connecting the LAN wiring from the line card in Slot 1. Repeat this step for jack Port 2 for the line card in Slot 2, etc.
2. Dress the cable(s) to the right and through the cable retainer.



3. Plug the other end of the cable into your IPC, Ethernet hub connector, or switch.

Hot Insertion or Removal of the SIM

If the port-card Ethernet interfaces are not being used, it is possible to remove the SIM without disrupting user data. However, if the user terminal (console) or 10BaseT management interface is connected, the management interface of the BAC will be interrupted. Also, the MAC addresses of the management interfaces will be redefined by the new SIM.

The SCP card must be reset when the SIM is removed or inserted.

Cabling: Test Access SIM

5

Test Access SIM

This chapter describes cabling for the Test Access System Interface Module (SIM), feature number 8820-S1-905, which has 12 8-pin ports:

- Clock A and Clock B – See *Connecting Clock Sources to Clock A and Clock B* on page 5-2
- MCP Serial – See *Connecting an MCP Card to a Terminal or PC* on page 5-2
- SCP Serial – See *Connecting an SCP Card to a Terminal or PC* on page 5-4
- Alarm In – See *Connecting the Alarm In Port to an External Alarm* on page 5-5
- Alarm Out – See *Connecting Alarm Out to the CO Alarm System* on page 5-6
- MCP LAN – See *Connecting an MCP to an SNMP Management System* on page 5-6
- SCP LAN – See *Connecting an SCP Card to an SNMP Management System* on page 5-7
- Hub-1 LAN and Hub-2 LAN – See *Connecting the Hub-1 and Hub-2 LAN Ports* on page 5-7
- TAP In and TAP Out – See *Using the Test Access Path (TAP) Ports* on page 5-8

For cabling of the standard 24-port SIM, see Chapter 4, *Cabling: Standard SIM*.

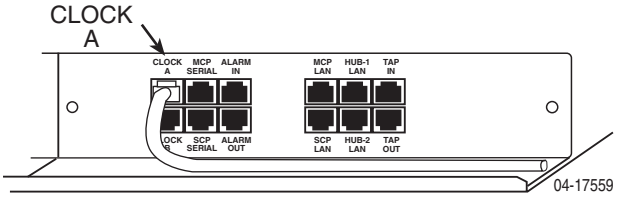
Connecting Clock Sources to Clock A and Clock B

Follow this procedure only if you want to use external BITS (Building Integrated Timing Supply) clocking in an SCP-based chassis. See *Clock A and Clock B* in Appendix A, *Pinouts*, for pinout information. See *Configuration - System Clock* in the SCP card's online Help for information about clocking and clock switching.

▶ Procedure

To connect the 8820 BAC to an external clock:

1. Plug the 8-pin modular cable into the Clock A or Clock B connector on the front of the 8820 chassis. The active SCP card has access to both connectors.



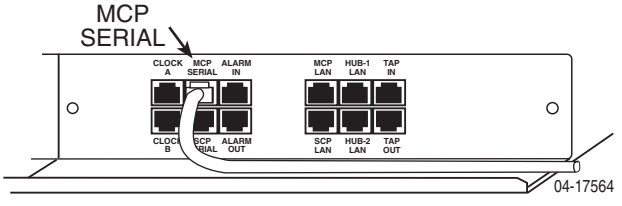
2. Connect the other end of the cable to the BITS clocking source.

Connecting an MCP Card to a Terminal or PC

▶ Procedure

To connect an MCP card to a terminal or PC:

1. Connect the serial cable with 8-pin modular plugs on each end (provided with the MCP card) into the SERIAL MCP port of the chassis.
2. Dress the cable to the right and through the cable retainer.



3. Plug the other end of the cable into the terminal or PC serial port, using the appropriate DB25 or DB9 adapter that is supplied with the MCP card.
4. Configure your terminal or terminal emulator with the following settings:
   - Baud Rate = 9600
   - Data Bits = 8
   - Parity = No Parity
   - Stop Bits = 1
   - Flow Control = None

Connecting to a Modem for Remote Management (with MCP)

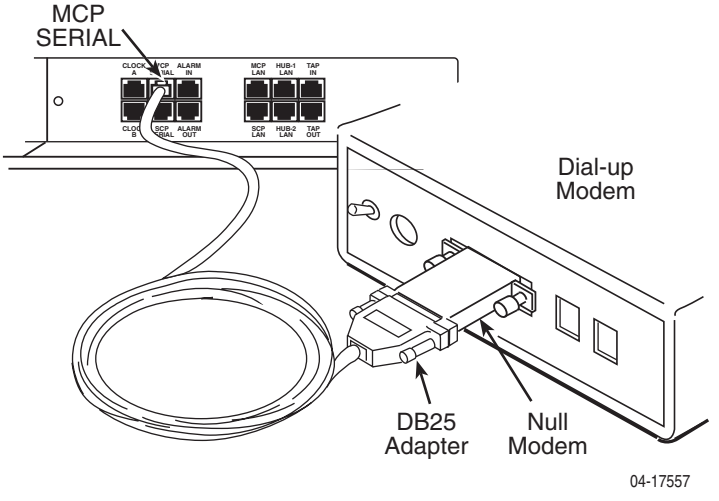
Before connecting the 8820 BAC to a standard AT dial-up modem, configure the modem with the following settings:

- Set the modem for auto answer. For example, ATS0=1.
- Turn off character echo. For example, ATE0.
- Enable result codes in originate mode only. For example, ATQ2.
- Set the modem to ignore Data Terminal Ready (DTR). For example, AT&D0.

▶ Procedure

To connect the 8820 BAC to a dial-up modem:

1. Plug a serial cable into the MCP Serial port of the chassis.
2. Dress the cable to the right and through the cable retainer.
3. Plug the other end of the cable into your modem's serial port using a DB25 adapter and a Null Modem.

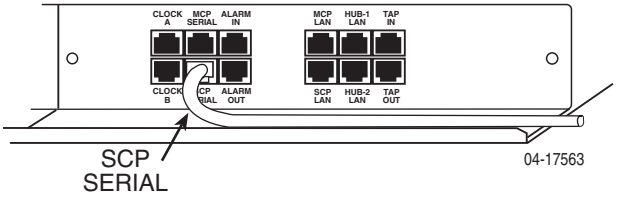


Connecting an SCP Card to a Terminal or PC

▶ Procedure

To connect an SCP card to a terminal or PC:

1. Connect the serial cable with 8-pin modular plugs on each end (provided with the SCP card) into the SCP Serial port of the SIM.



2. Dress the cable to the right and through the cable retainer.
3. Plug the other end of the cable into the terminal or PC serial port, using the DB9 adapter that is supplied with the SCP card.
4. Configure your terminal or terminal emulator with the following settings:
   — Baud Rate = 9600
   — Data Bits = 8
   — Parity = No Parity
   — Stop Bits = 1
   — Flow Control = None

Connecting to a Modem for Remote Management (with SCP Card)

Before connecting the 8820 BAC to a standard AT dial-up modem, configure the modem with the following settings:

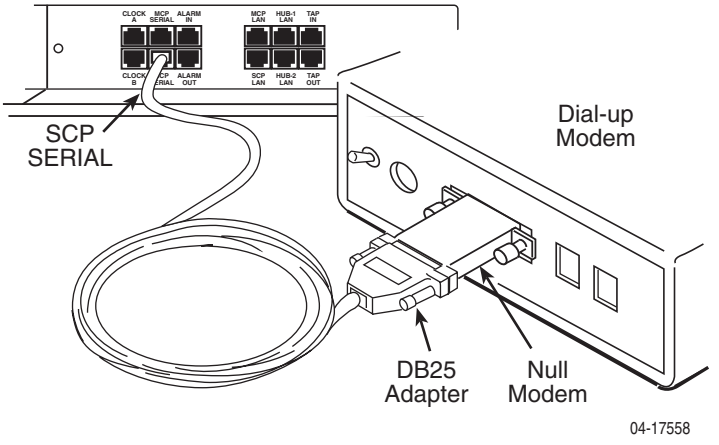
- Set the modem for auto answer. For example, ATS0=1.
- Turn off character echo. For example, ATE0.
- Enable result codes in originate mode only. For example, ATQ2.
- Set the modem to ignore Data Terminal Ready (DTR). For example, AT&D0.

▶ Procedure

To connect the 8820 BAC to a dial-up modem:

1. Plug a serial cable into the SCP Serial port of the chassis.
2. Dress the cable to the right and through the cable retainer.

3. Plug the other end of the cable into your modem's serial port using a DB25 adapter and a Null Modem.



Connecting the Alarm In Port to an External Alarm

The following procedure is optional. Follow this procedure if you want to connect a device that can close a contact upon failure to the BAC's alarm system. This might be used to provide an alarm in the event of:

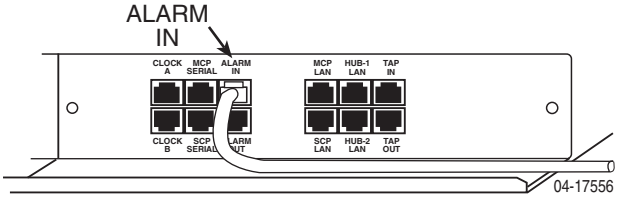
- Open door or close door detection at remote locations
- External fan failures
- External power failures in a Remote Terminal (RT)

See *Alarm In Connector* in Appendix A, *Pinouts*.

▶ Procedure

To connect a device to the 8820 BAC's Alarm IN port:

1. Plug an 8-pin modular cable into the Alarm IN port.
2. Dress the cable to the right in the cable tray.



3. Connect the other end of the cable to the device providing an alarm output.

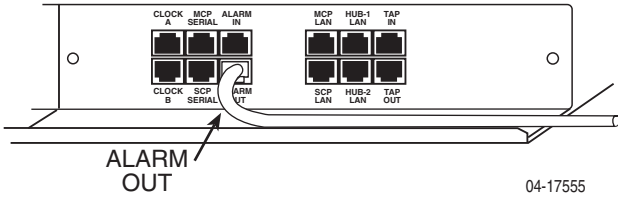
Connecting Alarm Out to the CO Alarm System

The following procedure is optional. Follow this procedure only if you want to connect to a CO alarm system. See *Alarm Out Connector* in Appendix A, *Pinouts*.

▶ Procedure

To connect the 8820 BAC to a CO alarm system:

1. Plug an 8-pin modular cable into the Alarm Out port of the chassis.
2. Dress the cable to the right in the cable tray.



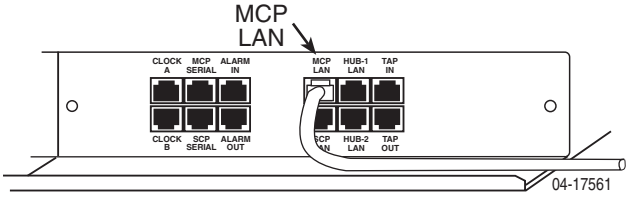
3. Connect the other end of the cable to the desired CO alarm system inputs.

Connecting an MCP to an SNMP Management System

▶ Procedure

To connect an MCP card to an SNMP management system, or for Telnet access to the MCP card:

1. Plug an 8-pin modular cable into LAN Slot 9 of the SIM, which corresponds to the MCP card in Slot 9 of the chassis.



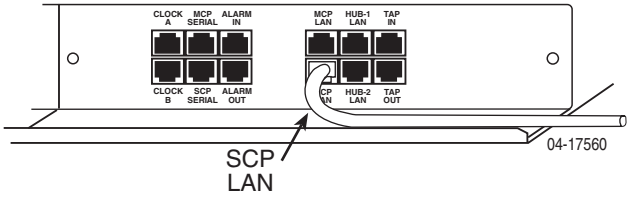
2. Dress the cable to the right and through the cable retainer.
3. Plug the other end of the cable into the 10/100BaseT hub connected to the SNMP management system network.

Connecting an SCP Card to an SNMP Management System

▶ Procedure

To connect an SCP card to an SNMP management system:

1. Plug an 8-pin modular cable into LAN SLOT A or B of the SIM, according to which slot the SCP card is installed.
2. For a chassis with a redundant SCP card, a cable is required in both the LAN SLOT A and LAN SLOT B jacks of the SIM.



3. Dress the cable or cables to the right and through the cable retainer.
4. Plug the other end of the cable or cables into the 10/100BaseT hub connected to the SNMP management system network.

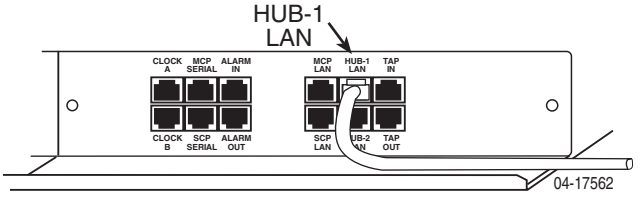
Connecting the Hub-1 and Hub-2 LAN Ports

The Hub-1 and Hub-2 LAN ports provide a NEBS-compliant hub for applications that require connecting external devices though the 8820 system. The SCP card and 8922 POTS card can be monitored using these ports.

▶ Procedure

To connect a Hub port:

1. Plug an 8-pin modular UTP CAT5 cable into the desired Hub LAN port.
2. Dress the cable(s) to the right and through the cable retainer.



3. Plug the other end of the cable into your external device.

Using the Test Access Path (TAP) Ports

The Test Access SIM provides input and output Test Access Path (TAP) ports. These are used in conjunction with Transaction Language 1 (TL1) commands for testing of cards (such as the 8922 POTS card) that support a Metallic Test Access Unit (MTAU) function.

See the *8620 and 8820 Broadband Access Concentrators TL1 Interface Reference* for more information.

Hot Insertion or Removal of the SIM

If the port-card Ethernet interfaces are not being used, it is possible to remove the SIM without disrupting user data. However, if the user terminal (console) or 10BaseT management interface is connected, the management interface of the BAC will be interrupted. Also, the MAC addresses of the management interfaces will be redefined by the new SIM.

The SCP card must be reset when the SIM is removed or inserted.

Troubleshooting

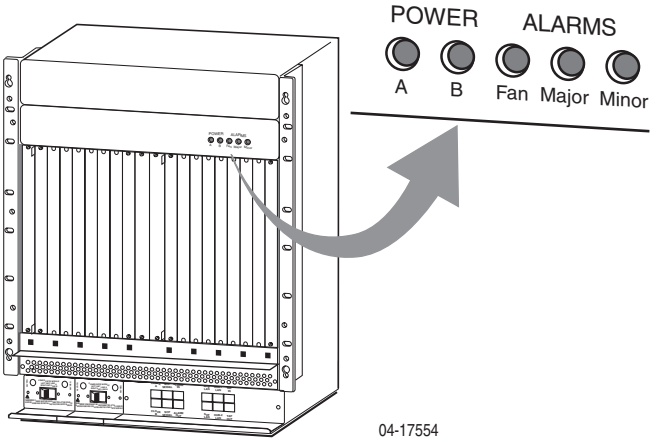
6

Troubleshooting Table

Symptom	Solutions
FAN Alarm is ON	**CAUTION**: This is a serious alarm and requires immediate attention. 1. Remove power. 2. Remove the fan tray from the chassis. 3. Inspect the fan tray, and replace if necessary. 4. Contact your service representative for assistance.
POWER A or POWER B LEDs are off	Using a voltmeter, check for power at the terminal connections. ■ If there is power, call your sales representative for service to the 8820 BAC. ■ If there is no power at the terminal, call an appropriate electrician.
SYSTEM ALM LED is ON and line card is inoperative in Slot *n*	*For an SCP-card-based chassis:* 1. Using the Status - Alarms screen of the web interface, determine what alarms have been reported against the line card. 2. If a major alarm is indicated, check the Ethernet connections on the SCP card and DSL port card. Make sure they are plugged in. 3. Remove and reinstall the card. *For an MCP-based chassis:* 1. Using the asynchronous terminal interface, choose Card Selection from the Main Menu to display the status of each line card. 2. If a major alarm is indicated, check the Ethernet connections on the MCP card and DSL port card. Make sure they are plugged in. 3. Use software to reset the line card (**A-A-E**). 4. Remove and reinstall the card.

LEDs

The following table describes the meaning and states of the LEDs on the front panel of the BAC. For individual card LEDs, see the appropriate card Installation Instructions.



LED	LED is . . .	Indicating . . .
Power A	Green	Normal operation for Power Source A.
	Off	Low or no voltage for Power Source A.
Power B	Green	Normal operation for Power Source B.
	Off	Low or no voltage for Power Source B.
Fan System Alarm	Yellow	Fan failure or a single fan in the Fan Module is working at less than 50% of its normal output.
	Off	Normal operation or no power.
Major Alarm	Yellow	Major alarm present on any of the cards in the chassis. The card with alarm conditions will also have its Alarm LED lit.
	Off	No major alarms.
Minor Alarm	Yellow	Minor alarm present on any of the cards (or Power Alarm problem) in the chassis. The card with alarm conditions will also have its Alarm LED lit.
	Off	No minor alarms.

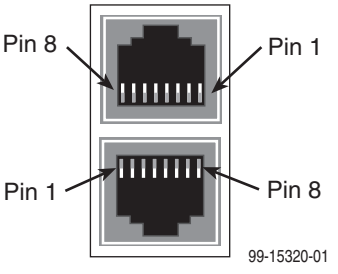
Pinouts

A

Clock A and Clock B

When an SCP card is installed, the CLOCK A and CLOCK B connectors may be used for system clocking. They have the following pin assignments:

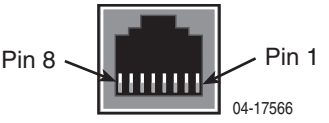
Pin Number	Use
1	Not used
2	Not used
3	Not used
4	Signal +
5	Signal –
6	Not used
7	Frame/Signal Ground
8	Not used



MCP Serial Connector

The 8-pin SERIAL MCP connector (8820-S1-902 SIM) or MCP SERIAL connector (8820-S1-905 SIM) is a DCE-type connection with the following pin assignments.

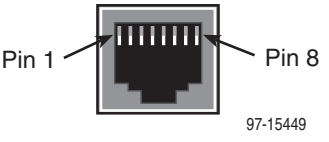
Pin Number	Use
1	Reserved
2	Reserved
3	Reserved
4	Signal Ground
5	Receive Data
6	Transmit Data
7	Reserved
8	Reserved



Serial SCM and SCP Serial Connector

The 8-pin SERIAL SCM connector (8820-S1-902) or SCP SERIAL connector (8820-S1-905) is a DCE-type connection with the following pin assignments.

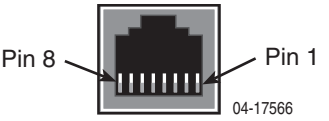
Pin Number	Use	Direction
1	Ring Indicator	Out
2	Receive Line Signal Detect	Out
3	Reserved	–
4	Signal Ground	–
5	Receive Data	Out
6	Transmit Data	In
7	Clear to Send	Out
8	Request to Send	In



Alarm In Connector

The ALARM IN connector (8820-S1-905) supports two alarm-in circuits.

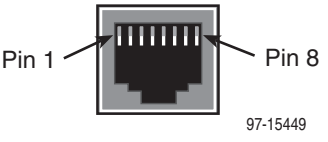
Pin Number	Use
1	Alarm Sense 1 +
2	Alarm Sense 1 –
3	Reserved
4	Reserved
5	Reserved
6	Reserved
7	Alarm Sense 2 +
8	Alarm Sense 2 –



Alarm Out Connector

The ALARM connector (8820-S1-902) or ALARM OUT connector (8820-S1-905) consists of two sets of dry contact closures on an 8-pin jack. The Alarm leads report major and minor alarms to a CO alarm system. The following table lists the pin assignments for the 8-pin jack.

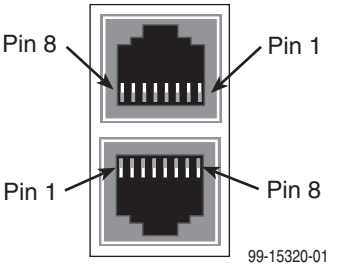
Pin Number	Use
1	Not Connected
2	Closed on Major Alarm (Normally Open)
3	Common on Major Alarm
4	Open on Major Alarm (Normally Closed)
5	Closed on Minor Alarm (Normally Open)
6	Common on Minor Alarm
7	Open on Minor Alarm (Normally Closed)
8	Not Connected



MCP LAN and SCP LAN Connectors

The 8-pin interfaces for the MCP LAN and SCP LAN 10BaseT connections (8820-S1-905) have the following pin assignments.

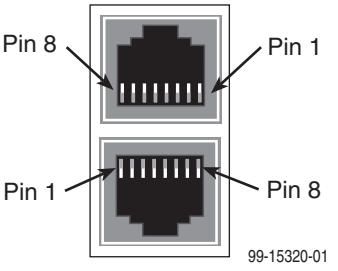
Pin Number	Use
1	TX Data +
2	TX Data –
3	RX Data +
4	Reserved
5	Reserved
6	RX Data –
7	Reserved
8	Reserved



HUB-1 and HUB-2 LAN Connectors

The 8-pin interfaces for the HUB-1 LAN and HUB-2 LAN 10BaseT connections (8820-S1-905) have the following pin assignments.

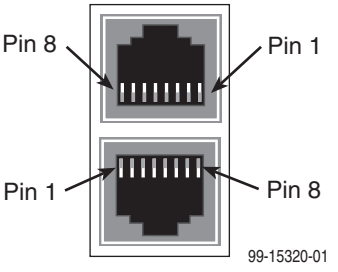
Pin Number	Use
1	TX Data +
2	TX Data –
3	RX Data +
4	Reserved
5	Reserved
6	RX Data –
7	Reserved
8	Reserved



LAN SLOT 10BaseT Connectors

The 8-pin interfaces for the LAN 10BaseT connections (8820-S1-902) have the following pin assignments.

Pin Number	Use
1	TX Data +
2	TX Data –
3	RX Data +
4	Reserved
5	Reserved
6	RX Data –
7	Reserved
8	Reserved

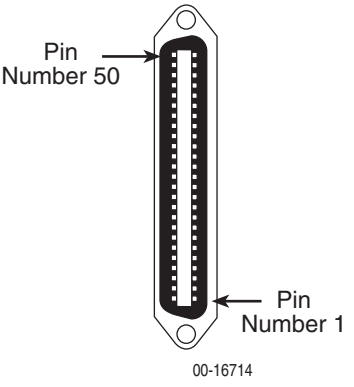


Telco 50-pin Connector Pinouts for DSL Loops and POTS Splitters

The 18 Telco-type 50-pin connectors on the rear of the chassis provide the 2-wire loop interface from each DSL port to either the POTS splitter card or, if the loop is not being shared with POTS, to the Main Distribution Frame (MDF). The following table lists the pin assignments for each of these interfaces.

Pinouts for DSL Ports for Each Slot

Port	Pins	Port	Pins
1	1, 26	13	13, 38
2	2, 27	14	14, 39
3	3, 28	15	15, 40
4	4, 29	16	16, 41
5	5, 30	17	17, 42
6	6, 31	18	18, 43
7	7, 32	19	19, 44
8	8, 33	20	20, 45
9	9, 34	21	21, 46
10	10, 35	22	22, 47
11	11, 36	23	23, 48
12	12, 37	24	24, 49
		25	25, 50



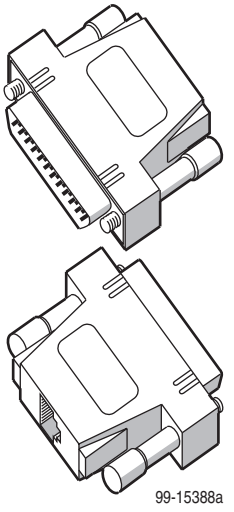
NOTE:

The above table lists the port assignments of the slots and their respective connectors for 25 ports. DSL port cards with less than 25 ports have their ports assigned in ascending order starting with port 1. For example, a 12-port line card uses Ports 1–12, while Ports 13–25 will not be connected by the port card.

DB25 Adapter Pinouts

The DB25 (RS-232 male) cable adapter provided with the MCP is used to convert the 8-pin modular serial interface to a standard RS-232 DB25 interface, which can then be connected to a terminal, computer, or any Data Termination Equipment (DTE). Connection to a modem requires a null modem adapter. The following table lists the pin assignments.

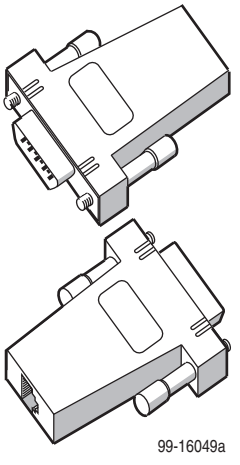
8-Pin Modular Serial Interface Pin Number	Use	DB25 Interface Pin Number
1 2	Pins 1 and 2 are shorted together	–
3	Data Terminal Ready	20
4	Signal Ground	7
5	Receive Data	3
6	Transmit Data	2
7	Clear to Send	5
8	Request to Send	4



DB9 Adapter Pinouts

The female DB9 cable adapter provided with the SCP card and the MCP is used to convert the 8-pin modular serial interface to a standard DB9 interface, which can then be connected to a laptop computer. The following table lists the pin assignments.

8-Pin Modular Serial Interface Pin Number	Use	DB9 Interface Pin Number
1 2	Pins 1 and 2 are shorted together	–
3	Data Terminal Ready	4
4	Signal Ground	5
5	Receive Data	2
6	Transmit Data	3
7	Clear to Send	8
8	Request to Send	7



Technical Specifications

B

Table B-1. 8820 BAC, Model 8820-A2-500, Technical Specifications (1 of 3)

Specifications	Criteria*
Certification	The 8820 BAC is Network Equipment-Building System (NEBS) certified.
Cooling and Air Handling	Each 8820 BAC is cooled by its integral, plug-in fan module assembly. Each chassis is independently cooled in a stack; it does not rely on vertical air flow in a frame.
Dimensions	Height: 24.5 inches or 14U (62.23 cm) Width: 17.20 inches (43.69 cm) (with 19-inch mounting brackets) Depth: 11.50 inches (29.21 cm) (with no cables) 12.00 inches (30.48 cm) (with rear cables) 14.70 inches (37.34 cm) (with front and rear cables) Weight: 49 pounds (22.3 kg) (without cards)
External Clocking	With an SCP card installed, the following clock rates are supported over the Clock A and Clock B connectors: ■ 2048 KHz (E1) ■ 1544 KHz (T1) ■ 64/8 KHz (standard BITS) ■ 64/8/0.4 KHz (standard BITS plus 400 Hz)
Grounding	Power lug on rear of chassis accepts 8 AWG wire.

* Technical Specifications subject to change without notification.

Table B-1. 8820 BAC, Model 8820-A2-500, Technical Specifications (2 of 3)

Specifications	Criteria*
Interfaces	■ Two rear-mounted interfaces: Eighteen 50-pin Telco-type connectors for DSL loop interfaces, and PWR A and PWR B, DC power access ■ One rear-mounted ground lug for connecting CO ground ■ DC Power (two pairs of screw terminals for A and B inputs) ■ Two 8-pin modular jacks for external clocking ■ One management 10/100BaseT and one management Serial interface for the MCP card ■ Local CO alarm system, major and minor alarms (two pairs of dry contact closures via an 8-pin modular jack; supports up to 57 VDC, 0.1 amp) *With 8820-S1-902 Standard SIM:* ■ AC Alarm. High Impedance = Normal, Low Impedance = Alarm ■ Eighteen 8-pin modular jacks for 10/100BaseT LAN connection *With 8820-S1-905 Test Access SIM:* ■ One management 10/100BaseT and one management Serial interface for the SCP card ■ 8-pin modular Alarm In jack ■ 8-pin modular Hub-1 and Hub-2 LAN jacks ■ 8-pin modular TAP In and TAP Out jacks
Operating Environment	
8820-A2-500 8820-A2-515 8820-A2-520	Ambient Temperature: 32° to 122° F (0° to 50° C) Relative Humidity: 5% to 95% noncondensing Storage Temperature: –40° F to 158° F (–40° C to 70° C) Shock and vibration sufficient to withstand normal shipping
8820-A2-530	Ambient Temperature: –40° to 149° F (–40° to 65° C) Relative Humidity: 5% to 95% noncondensing Storage Temperature: –40° F to 185° F (–40° C to 85° C) Shock and vibration sufficient to withstand normal shipping
Power Dissipation	Power dissipation depends upon the type and number of cards installed in the chassis. The 8820 BAC is capable of supporting up to eighteen 48-port line cards and up to two SCPs, for a maximum rated chassis dissipation of 1162 watts. When installed under NEBS rules, the maximum power dissipation for a single frame is limited to 181.2 watts per square foot. The square footage allocated to a rack equipped with the 8820 BAC is approximately 7 square feet. This equates to a maximum permissible NEBs power dissipation of 1268.4 watts per frame. Be careful not to exceed the 1268.4-watt NEBS limit when installing port cards for the first time, when adding cards to an existing chassis, or when replacing existing port cards with cards of a different type or wattage.

* Technical Specifications subject to change without notification.

Table B-1. 8820 BAC, Model 8820-A2-500, Technical Specifications (3 of 3)

Specifications	Criteria*
Power Requirements	Both front and rear power connections require the use of 8 AWG standard wire.
8820-A2-500 8820-A2-515 8820-A2-520	The chassis operates from a standard CO –48 VDC power supply (–42.0 to –57.0 VDC).
8820-A2-530	The chassis operates from a standard CO –48 or –60 VDC power supply (–40 to –72.0 VDC).

* Technical Specifications subject to change without notification.

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